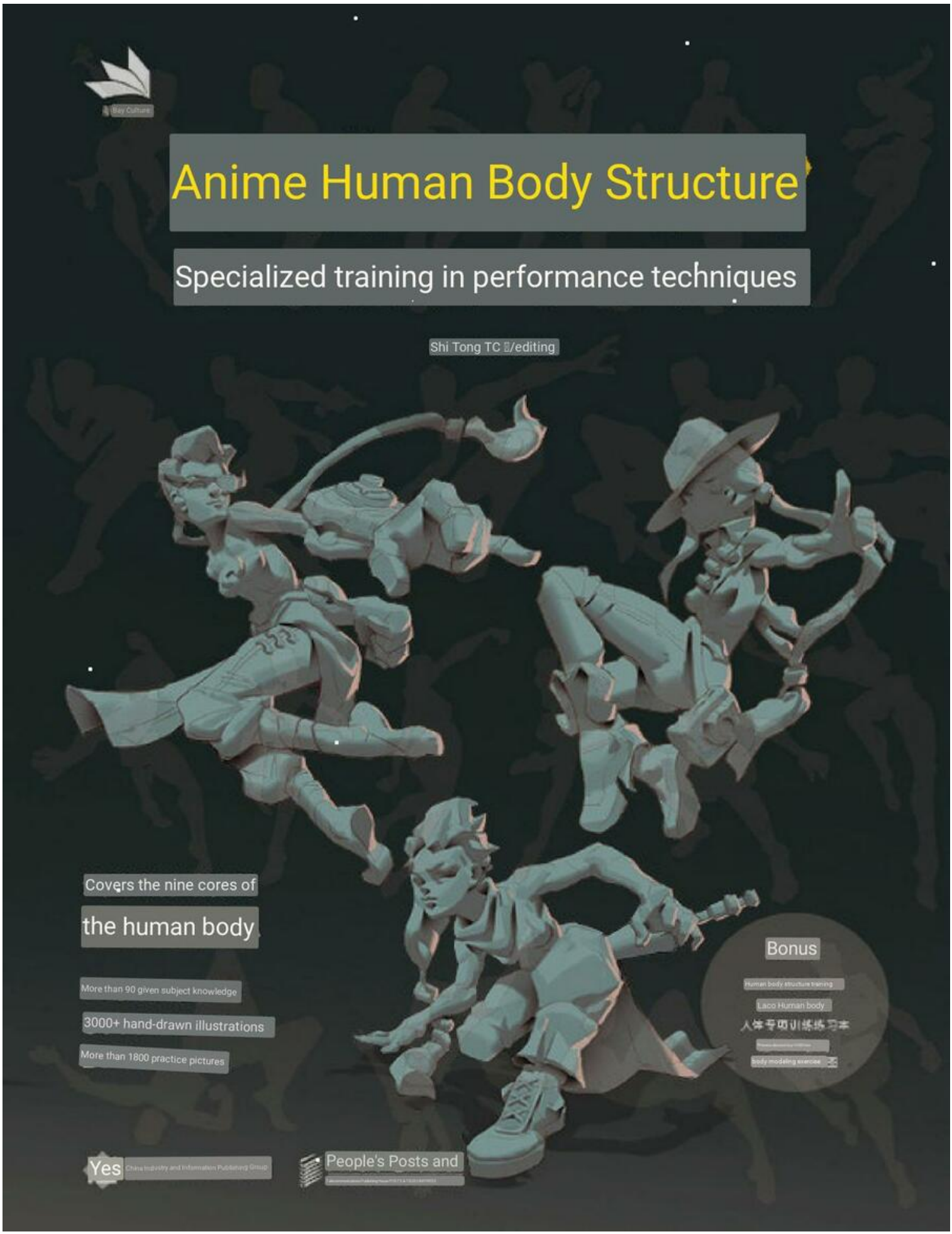

Anime Human Body Structure
Specialized training in performance techniques
Shi Tong TC /editing
Covers the nine cores of
the human body
More than 90 given subject knowledge
3000+ hand-drawn illustrations
More than 1800 practice pictures
Bonus
Human body structure training
Laco Human body
人体专项训练练习本
body modeling exercise
Yes
China Industry and Information Publishing Group
People's Posts and

Special training in animation human body structure expression techniques

Shi Tong TC Chen/Editor

People's Posts and Telecommunications Publishing

House Beijing

Cataloging of Books in Publication (CIP) data

Special training on animation human body structure expression techniques / Shi Tong, edited by TC Chen.–Beijing: People's Posts and Telecommunications Publisher, 2022.6

ISBN 978-7-115-57771-9

I. ▯Move... II. ▯Shi...▯T... III. ▯Cartoon—figure drawing techniques—teaching materials

Ⅳ. ①J218.2

Chinese Version Library CIP Data Core Word (2021) No. 220748

Edited by Shi Tong TC Chen

Editor in charge Zhang Danyang

Responsible printing Ma Zhenwu

Published by People's Posts and Telecommunications Publishing House

No. 11 Chengshousi Road, Fengtai District, Beijing Postcode 100164 Email 315@ptpress.com.cn

Website https://www.ptpress.com.cn

Printing by Beijing Baolong Century Printing Co., Ltd.

Folio: 880×1230 1/16

Sheet: 28.75 Words:

1035 thousand words

1st edition June 2022

The first printing in Beijing in June 2022

Reader Service Hotline: (010)81055410 Printing Quality Hotline: (010)81055316

Anti-piracy hotline: (010)81055315

Advertising business license: Jingdong City Jianguang Dengzi No. 20170147

Table of contents

executive summary

foreword

Resources and Support

Chapter 1 Head Special Training

1.1 Proportion of the head

1.1.1 Overall scale analysis of the head

1.1.2 Analysis of the facial proportion of the head

1.2 The overall shape of the head

1.2.1 Analysis of the geometric shape of the head

1.2.2 The influence of head bones and muscles on body performance

1.2.3 The connection between head and neck

1.3 facial features and expressions

1.3.1 Eyes

1.3.2 Eyebrows

1.3.3 Nose

1.3.4 Mouth

1.3.5 Ears

1.3.6 Expressions

1.4 Hair

1.4.1 Cognition of hair

1.4.2 Basic morphological performance of hair

1.5 Dynamic performance of the head

More special training

Chapter 2 Torso Special Training

2.1 Torso proportional structure

2.1.1 The proportions of the torso

2.1.2 Structure of the torso

2.2 Cognition and drawing skills of thoracic cavity

2.2.1 Basic proportions of the ribcage

2.2.2 Structure and perspective of the thoracic cavity

2.2.3 The relationship between arm joint ball and thoracic cavity

2.2.4 Adding muscles to the ribcage

2.2.5 Characteristics of female thoracic cavity

2.3 Proportion and spatial perception of the pelvis

2.3.1 Proportion of the pelvis

2.3.2 Structural simplification and spatial cognition of the pelvis

2.3.3 The influence of the pelvic buttocks rendering

2.4 Influence of trunk bones and muscles on body surface performance

2.4.1 Influence of scapula and muscle groups on body surface performance

2.4.2 Influence of sternocleidomastoid muscle on body surface performance

2.4.3 Influence of trapezius muscle on body surface performance

2.4.4 Influence of deltoid muscle on body surface performance

2.4.5 Influence of pectoralis major on body surface performance

2.4.6 Influence of external oblique muscle on body surface performance

2.4.7 The effect of the rectus abdominis on body performance

2.4.8 The effect of erector spinae on body performance

2.4.9 Influence of latissimus dorsi on body surface performance

2.4.10 Influence of gluteus maximus on body surface performance

2.4.11 Influence of serratus anterior on body surface performance

2.5 Simplified torso mass and muscles

2.5.1 Simplified torso mass structure

2.5.2 Simplified trunk muscle structure 2.6

Torsion and dynamic performance of trunk

2.6.1 Left and right bending

2.6.2 Bending back

2.6.3 Bend forward

2.6.4 Left and right twist

More special training

Chapter 3 Special Arm Training

3.1 Proportional structure of the arm

3.2 Influence of arm bones and muscles on body surface performance

3.2.1 Influence of arm bones on body surface performance

3.2.2 Influence of arm muscles on body surface performance

3.3 The connection between the arm, the torso and the hand

3.3.1 Articulation of the arm with the scapula and clavicle

3.3.2 Articulation and movement of the forearm

3.4 Arm twist and dynamic performance

3.4.1 Basic twist of the arm

3.4.2 Dynamic performance of the arm

More special training

Chapter 4 Special Leg Training

4.1 Proportional structure of the legs

4.2 Influence of leg bones and muscles on body performance

4.2.1 Influence of leg bones on body surface performance

4.2.2 Influence of leg muscles on body surface performance

4.3 The connection between the legs and the pelvis and feet

4.3.1 Connection between legs and pelvis

4.3.2 Connection between legs and feet

4.4 Torsion and dynamic performance of the legs

4.4.1 Twisting of the legs

4.4.2 Dynamic performance of legs

More special training

Chapter 5 Specialized Hand Training

5.1 Proportional structure of the hand

5.2 Influence of hand bones and muscles on body surface performance

5.2.1 Influence of hand bones on body surface performance

5.2.2 Influence of hand muscles on body surface performance

5.3 Connection of the hand

5.3.1 Hand and wrist connection

5.3.2 Connection between palm and fingers

5.4 Hand twist and dynamic performance

5.4.1 Hand twist performance

5.4.2 Dynamic hand performance

More special training

Chapter 6 Special Foot Training

6.1 Proportional structure of the foot

6.1.1 Scale

6.1.2 Structure

6.2 Influence of Foot Bones and Muscles on Surface Performance

6.2.1 Influence of foot skeleton on body surface performance

6.2.2 Influence of Foot Muscles on Body Surface Performance

6.3 The connection of the foot

6.4 Foot twist and dynamic performance

6.4.1 Torsion of the foot

6.4.2 Dynamic performance of the foot

More special training

Chapter 7 Dynamic Special Training

7.1 Human body size

7.1.1 Normal body type

7.1.2 Exaggerated body shape

7.2 Body mass exercises

7.2.1 Proportion and Spatial Position of Human Body Mass

7.2.2 The body mass dynamics and angle of the human body 7.2.3

The transformation of the body mass person and the muscular person

7.3 Basic performance of human body dynamics

7.3.1 "Twisting Torso" of Dynamic Core

7.3.2 The influence of twisting of limbs and head on human body dynamics

7.3.3 Combination of dynamic lines and graphics 7.3.4

Dynamic performance of human body from multiple angles and motion trends

More special training

Chapter 8 Light and Shadow Special Training

8.1 Basic Concepts of Light and Shadow

8.1.1 The three sides and the five tones

8.1.2 How to calculate light and shade

8.2 Shaping of light and shadow

8.2.1 Spatial geometry

8.2.2 Light and shadow performance of human body under different light sources

8.3 Instance performance and analysis of light and shadow

8.3.1 Light and shadow modeling of Tang Palace night banquet

8.3.2 Pink girl light and shadow modeling

8.3.3 Light and shadow modeling for girls facing up

More special training

Chapter 9 Special training on pleats

9.1 The formation of pleats

9.1.1 Gravity factor

9.1.2 External extrusion

9.2 Common forms of pleats

9.2.1 Drop type

9.2.2 Tubular

9.2.3 Spiral

9.2.4 Shawl type 9.3.1

9.2.5 "Zig"

9.2.6 Half buckle type

9.3 Basic exercises for pleats

General practice of pleats 9.3.2 The

relationship between pleats and the human body

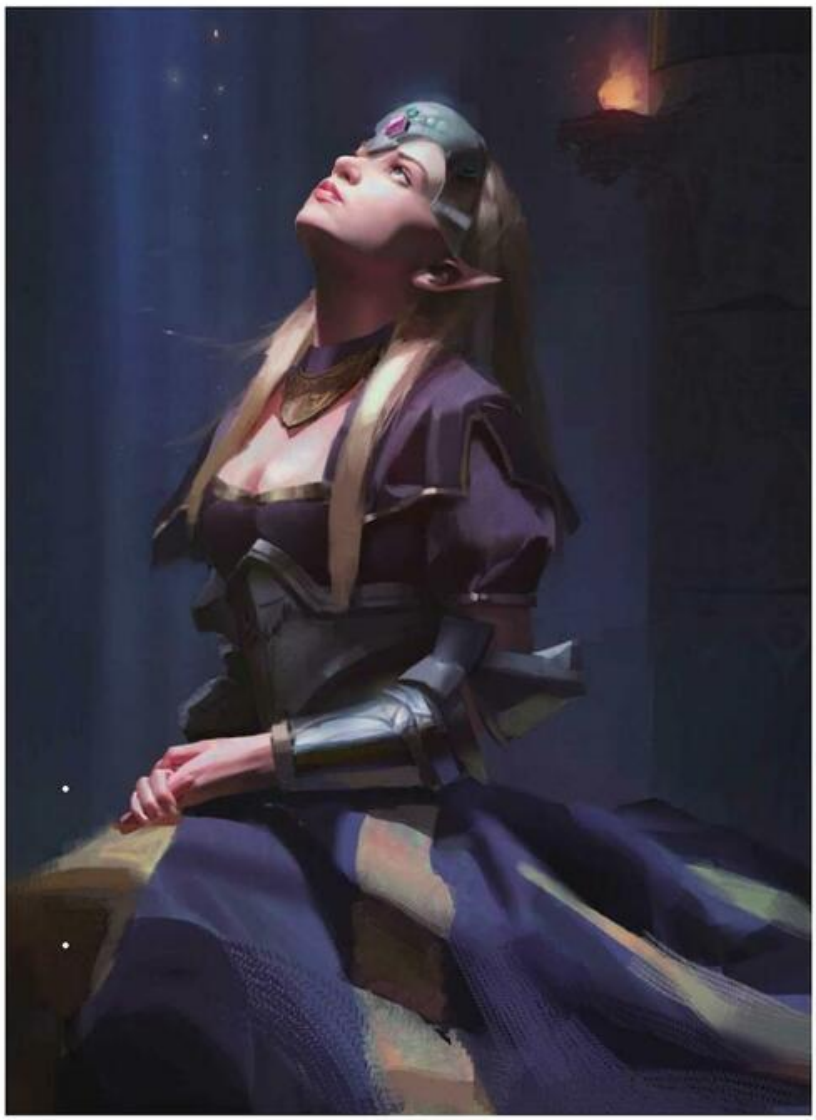
More special training

executive summary

This book summarizes the thoughts and insights of the two teachers in their work and teaching exploration. Through systematic and diversified teaching methods and painting demonstrations, it leads readers to study comprehensively and systematically, avoid detours, and lay a solid foundation for body painting.

The content of the whole book is developed in the form of modular special exercises. The human body is divided into several parts such as the head, torso, arms, legs, hands, and feet, and the key analysis is carried out. Then, these parts are combined with the perspective of the human body as the core. Human body rotation and dynamic special training, and finally through the two special trainings of light and shadow and clothing pleats to test the reader's understanding of the knowledge of human body structure. The content arrangement is interlocking, and the knowledge context is clear and clear.

This book is suitable for beginners of human body structure, students majoring in painting art, and painting practitioners with certain experience to learn and consolidate the foundation of human body structure, and solve various problems encountered in daily human body structure practice.



foreword

Do you always feel that you are not three-dimensional when you draw people, and your understanding of the perspective and structure of the human body is vague? Are you distressed that there is no systematic human body practice method to guide your daily practice method?

Towards?

Do you want to enter the animation game industry but don't know where to start?

Many friends are very interested in the animation and game industry, and want to enter this field, but they are hindered by some factors - there are many kinds of painting tutorials on the market, and the quality is uneven, and it is difficult for beginners to choose a complete set that is suitable for their own learning. It is easy to get confused and cannot find the correct learning direction, so it is very likely that there is a constant learning curve. Detours in entanglement and confusion, and even gradually give up painting.

In response to the above problems, we combined many years of practical work and teaching experience, and took two years to jointly compile this human body structure training course. Whether it is the logical sorting of knowledge points, the rhythm of practice, or the quality of practice diagrams, this book can meet the actual needs of readers, and help readers quickly change from a "little white" in body painting to a master in body painting. From the perspective of professional painting training teachers, this book will open the door to the field of animation and game painting for zero-based readers.

During the exercise, the reader needs to follow the knowledge structure arranged in this book, complete the exercise step by step from front to back, learn and consolidate the knowledge points of one stage, and then enter the next stage, and then stick to it. Persevere and believe that you will succeed!

In order to improve the efficiency of painting practice for beginners, here are 5 suggestions.

- Set a small goal. For beginners, the initial goals can be small, easy-to-achieve goals, such as practicing painting for 10 minutes a day and punching in one body painting every day. have a certain foundation

Afterwards, the goal can be to draw a relatively complete publicity-level product, find a job and get ability improvement from practice, etc. At each stage, experience should be summed up and habits should be gradually formed, and there will be progress after accumulation.

- Increase practice time. Turn a 10-minute daily practice into a 30-minute daily practice with an extra 20 minutes of drawing.
- Find a practice method that suits you better. Discover yourself based on the theories presented in this book Practice what you are better at. Draw
- something that you don't like and that you're not good at. Most of those who are interested have their own advantages

And when you are good at it, when you master all the things you don't want to draw, you can increase your confidence and be willing to do more such exercises.

- Active practice. Persistence is painful. If you say that you have been insisting on painting, it may indicate that you are not happy in painting, and you are essentially repelling painting. If you have gained something in your painting, it is recommended to post your painting on the Internet, so that everyone can give you a thumbs up and enhance your confidence. At this time, you will be more active in painting and improve your painting level. Active practice is much more effective than passively doing some planning and forcing yourself to complete it, because passively doing things are often easy to give up.

Finally, I would like to thank the editors of People's P~sts and Telecommunications Publishing House for their help and readers for their recognition and support.

Shitong TC Morning

July 2021

Resources and Support

This book is produced by "Shuyishe", and the "Shuyishe" community platform (www.shuyishe.com) is

You provide follow-up services.

Supporting resources

Get it online

Over 1000 body modeling exercises

Comes with the book

Anatomy training pull-up page

Human body dynamic folding

Human body special training exercise book

Please scan the code to obtain resources

The "Shuyi Design" community platform provides professional educational products for art design practitioners

contact us

Our contact email is szys@ptpress.com.cn. If you have any questions or suggestions about this book, please send us an email, and please indicate the book title and ISBN in the subject of the email, so that we can give feedback more efficiently.

If you are interested in publishing books, recording teaching courses, or participating in technical review, etc., you can email us. If schools, training institutions or enterprises want to buy this book or other books published by "Shu Art Design" in bulk, you can also contact us by email.

If you find various forms of piracy of books produced by "Shuyi Design" on the Internet, including unauthorized dissemination of all or part of the contents of the books, please send us the link of suspected infringement by email. This action of yours is to protect the rights of authors, and it is also the source of motivation for us to continue to provide you with valuable content.

About "Digital Art"

People's Posts and Telecommunications Publishing House Co., Ltd.'s brand "Shuyi Design" focuses on the publishing of professional art and design books, providing art and design practitioners with professional books, video e-books, courses and other educational products. The publishing field involves digital art categories such as graphic, three-dimensional, film and television, photography and post-production, design theory and application categories such as font design, brand design, color design, UI design, e-commerce design, new media design, game design, interaction design, prototype Design and other Internet design categories, Huanyi design hand-painted, illustration design hand-painted, industrial design hand-painted and other design hand-painted categories. For more services, please visit the "shuyishe" community platform www.shuyishe.com. We will provide timely, accurate and professional learning services.

Chapter 1 Head Special Training

In the process of learning to draw the human body, many people are often used to drawing from the head. A good looking head can be the highlight of the picture. This chapter covers head proportions, head mass, head structure, and head bones in detail. It includes the cognition of angles, helps readers improve their spatial thinking ability, learns to deduce the spatial relationship of the human head on the basis of body blocks, and then draws a good-looking head.

1.1 Proportion of the head

In the learning process, it is very important to master the proportion of the head, and accurate proportion is the foundation of drawing a good head.

1.1.1 Overall scale analysis of the head

When painting, the "head length" (excluding hair) is usually used as the basic unit to study the proportional relationship between human body parts and the whole, and parts and parts.

The head-to-body ratio of an average adult is 1:7~1:8. In actual painting, the style and form of the characters are different, and their head-to-body ratios will also be different.

9 head and body: It belongs to the proportion of the model's body and is suitable for expressing the character model in the clothing renderings. special.

7~8 head and body: It belongs to the normal body proportion, suitable for people who express most painting styles thing.

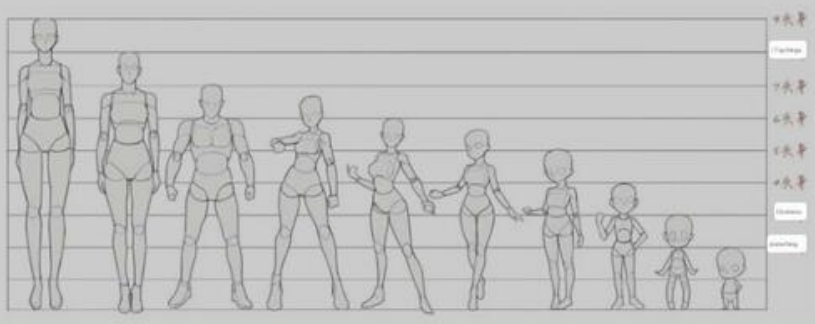
6 head and body: suitable for girls aged 12 to 16, the upper body can be shortened, Legs are elongated.

5 head and body: suitable for children aged 8 to 12, such as teenagers in comics.

4 head and body: suitable for children aged 6 to 8.

3 head and body: suitable for children aged 3 to 5, as well as characters in the Q version.

2 head and body: suitable for infants and young children aged 0-2. The head and the body are each half, but the head is larger than the body, which can make the characters look cute and cute, and is generally used to express Q version characters.



hint

In painting, in addition to the above common head-to-body ratios, there are some special head-to-body ratios, and even a 1:12 head-to-body ratio. There is no fixed standard for these, and it needs to be selected and controlled according to the characteristics of the characters to be created.

1.1.2 Analysis of the facial proportion of the head

When it comes to the proportion of a person's face, those who study art must know the concept of "three courts and five eyes". What exactly are "three courts and five eyes"? Should any painting form follow the proportion of "three courts and five eyes"? We approach this section with these two questions.

·The concept of "Three Courts and Five Eyes"

"Three Courts and Five Eyes" is an important proportional reference when drawing a character's face. The "three courts" are divided into upper court, middle court and lower court. As far as the standard facial proportions are concerned, the three courts are almost equal in height.

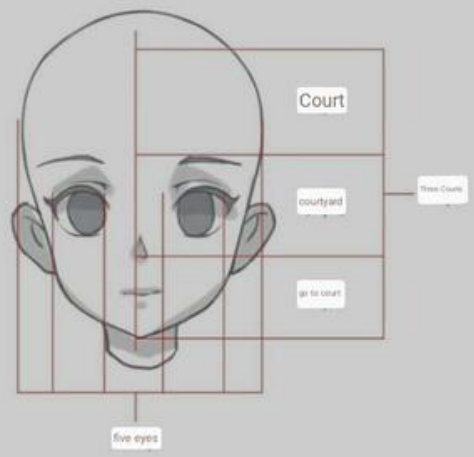
Upper court: the part from the hairline to the eyebrow arch.

Atrium: The part from the eyebrow arch to the bottom of the nose.

Lower Court: The part from the bottom of the nose to the chin.

"Five eyes" refers to dividing the widest part of the head into 5 parts. The width of 5 copies in a realistic style painting equal, while other styles of paintings such as Japanese do not necessarily have to be equally divided. In addition, two points should be noted: one is that the position of the eyebrow arch is only the front end of the eyebrow, not the tip of the eyebrow;

When measuring and dividing the five eyes, the part of the ear should be removed from the widest part of the head.

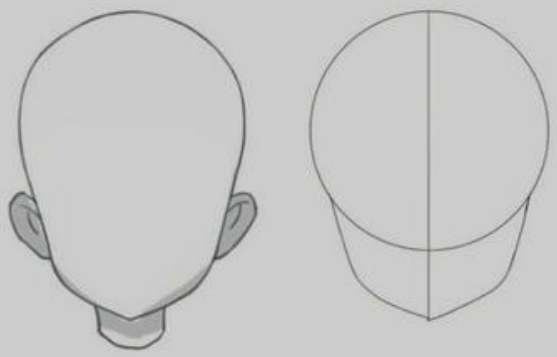


After understanding the basic concept of "Three Courts and Five Eyes", we will explain how we should use this concept in actual painting.

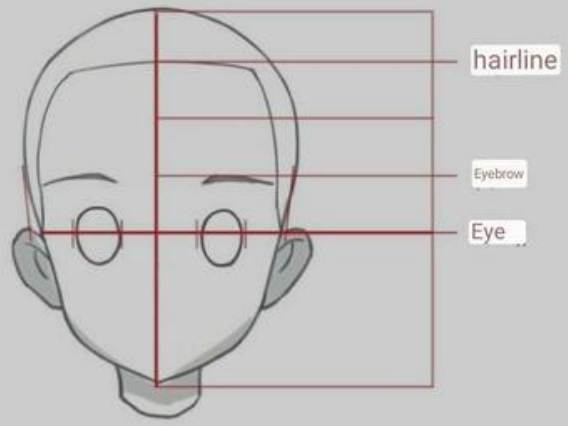
Fundamentally, the concept of "Three Courts and Five Eyes" was proposed to assist in determining the five senses. location and scale. In the process of determining the position and proportion of the facial features, attention should be paid to the painting steps.

The following takes the frontal head as an example to explain the application of "three courts and five eyes". The specific drawing process is as follows.

01 Draw the basic outline of the head, the aspect ratio of the head outline is about 2:1. You can draw a circle first, then draw the chin down, and finally adjust the frontal head outline.



02 Draw the "cross line" of the face, divide the horizontal "cross line" of the face into 5 parts, and determine the position of the eyes. Divide the area from the horizontal line of the facial "cross hair" to the top of the head into 4 equal parts, and determine the position of the hairline and eyebrows.



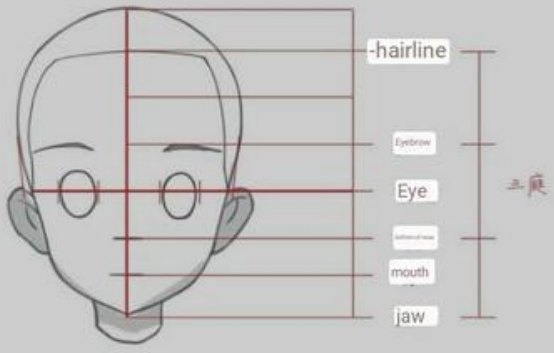
hint

The height of the hairline of different people is different, and the position of the hairline can be adjusted appropriately according to the standard

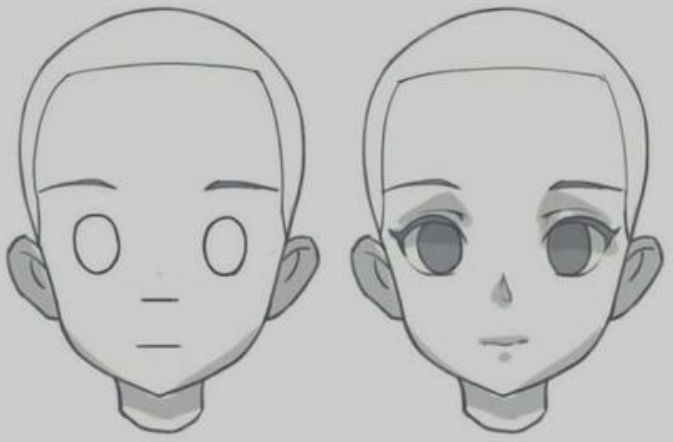
proportion. 03 Determine the position of the hairline, divide the area from the hairline to the chin into three equal parts, representing "three

In this way, the position of the eyebrow arch and the bottom of the nose can be calculated according to the ratio of "three courts and five eyes".

Finally, determine the position of the mouth in the middle of the lower court.



04Describe the details of the facial features, so that the front head is drawn.



According to the drawing method of the front head, the side head can be drawn. If you find that the head is not drawn well, you can follow the steps above to check where the proportions are not accurate.

hint

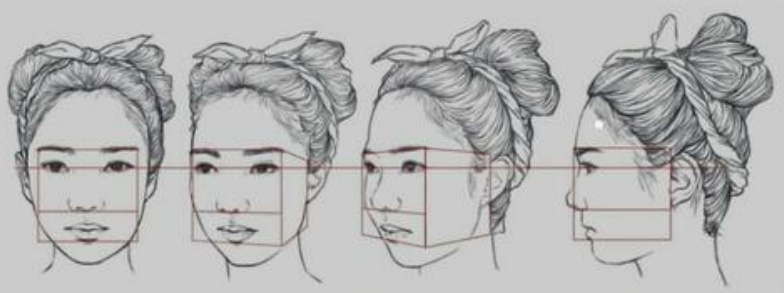
The middle of the lower court of the characters in the realistic painting method is the bottom of the lower lip of the lips, not the lip gap as we think. Characters in other styles of painting such as two-dimensional elements can appropriately adjust the position of their mouths according to their performance needs.

·The scaling calculation method of "Three Courts and Five Eyes"

After understanding the concept of "three courts and five eyes" of the head, it is necessary to pay attention to the problem of head scaling.

Perspective zoom can be formed by adding scale to perspective representation. The purpose of studying perspective is to quickly determine the position of the five senses even if there is a perspective angle. Take a look at the following set of avatars,

It is much easier to understand the part of the facial features by simplifying it into a cube.

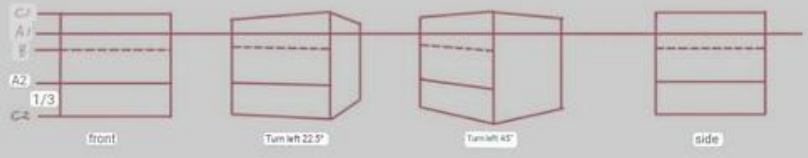


"hint

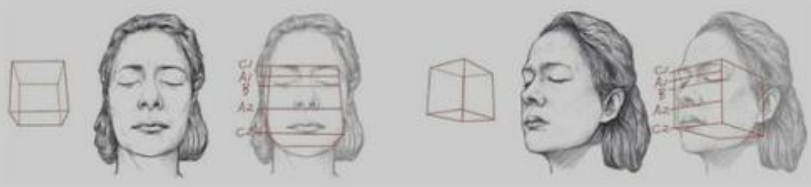
The reason why we choose to use a cube instead of a cuboid is because the cube can easily become the quantification standard after rotation, and it is not convenient to calculate the perspective ratio after the cuboid is rotated.

example.

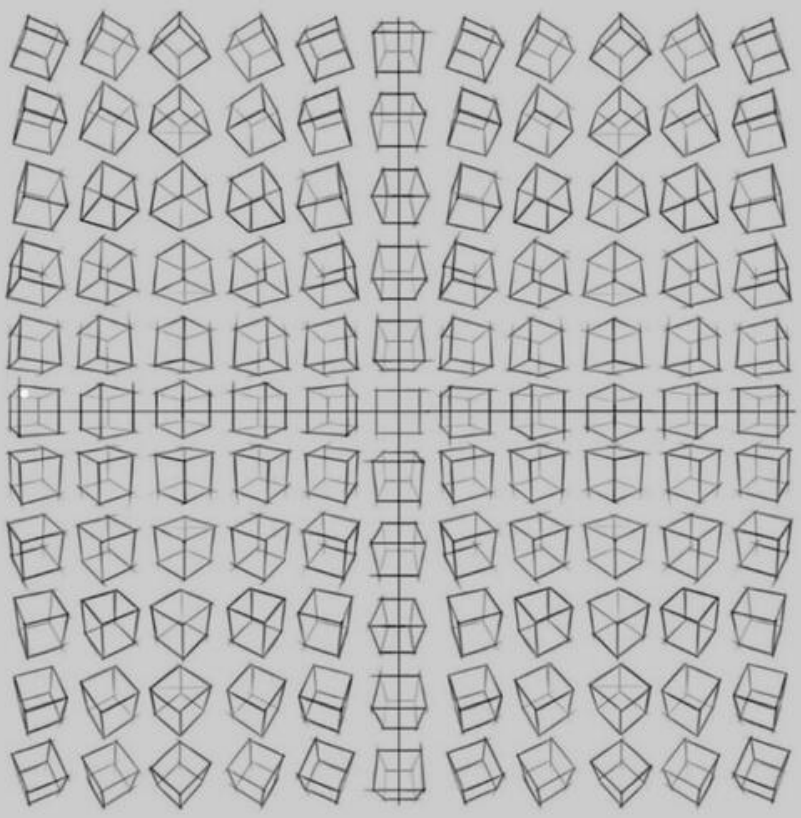
Looking at the picture below, we can see from the "three courts and five eyes" that the height of the atrium C1 to A2 is twice as high as that of A2 to C2, and the auxiliary line B is used to divide C1 to A2, and A1 (the position of the eyes) is about C1 to B. 1/2 of . After determining this proportional relationship, even if the cube is arbitrarily rotated, we can quickly Determine the location of the five senses.



In other perspective angles, this method can also be used to determine the position of the facial features of the head, and to check whether the proportions of the facial features are correct.



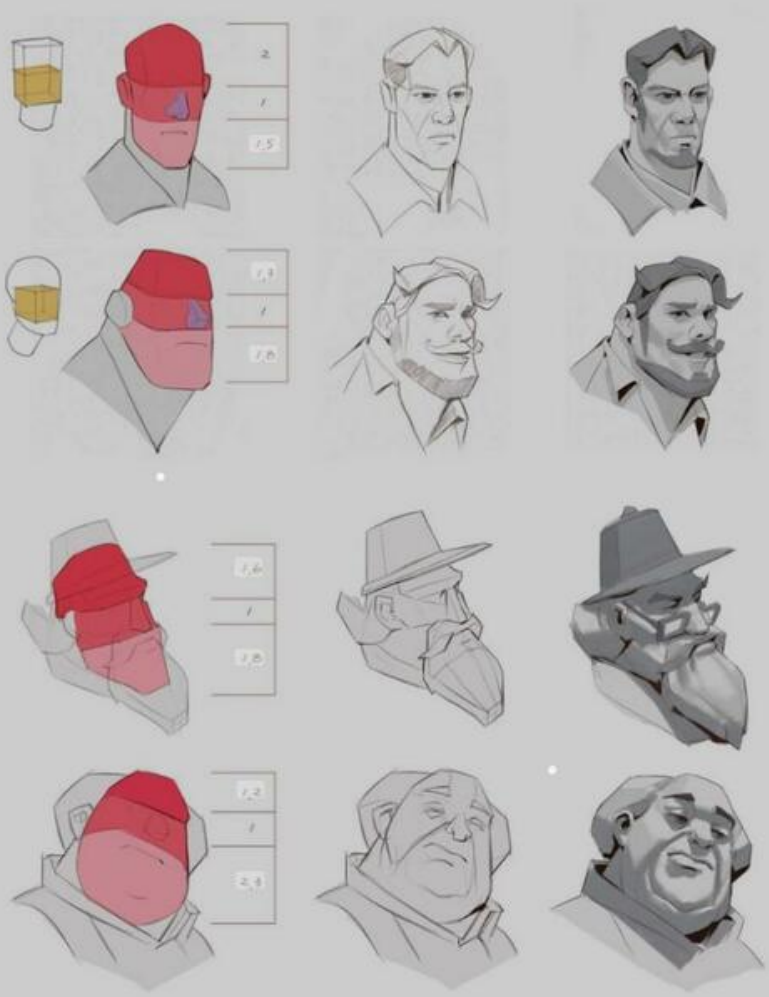
If you can't draw the perspective effect of the cube, you can practice according to the following figure, and draw the shape of the cube every 15° of rotation.

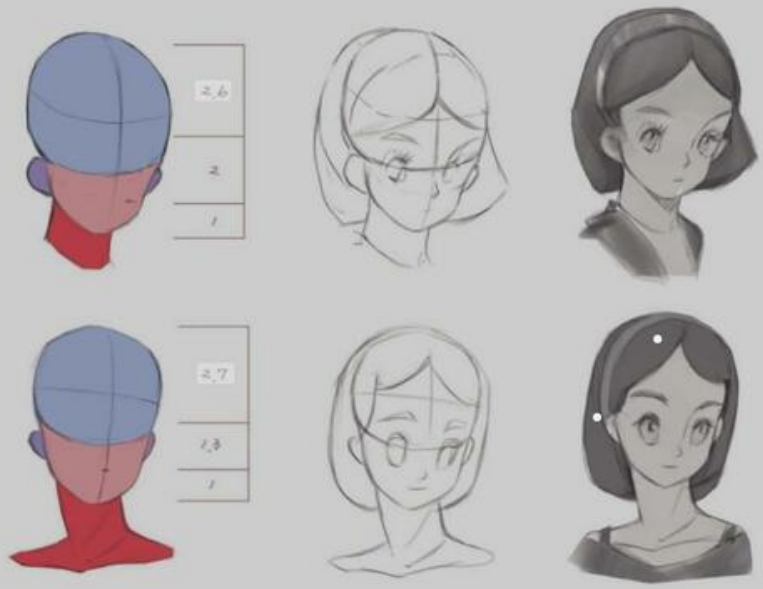


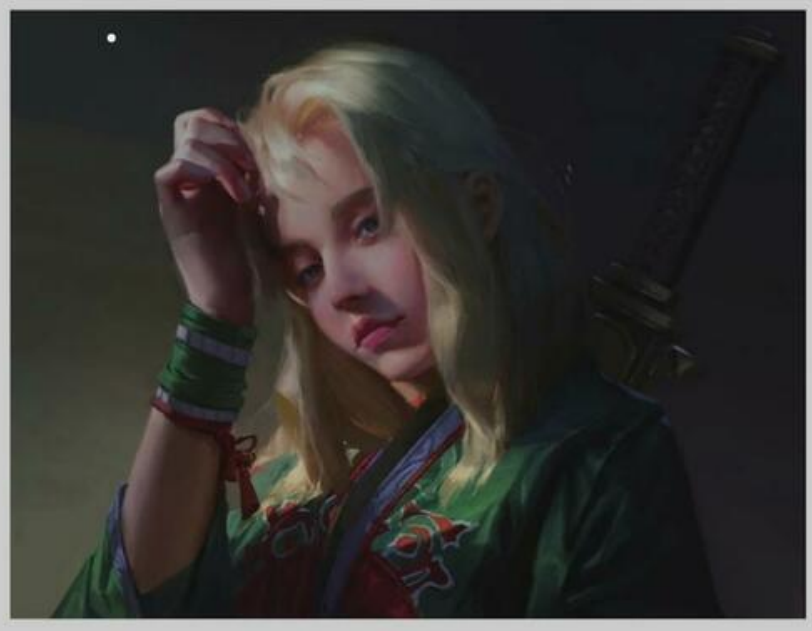
- Limitations of "Three Courts and Five Eyes"

You must know that the concept of "Three Courts and Five Eyes" does not apply to all forms of painting. Because in actual painting, the head of the human body we draw is not necessarily realistic, and the proportions of the facial features may be adjusted according to the character of the drawn character.

Take the following sets of exaggerated comic-style avatars as examples to observe the changes in the characters' "three courts and five eyes" and facial features. Generally speaking, except for the realistic style head, other styles of head need to be redesigned in proportion to make the style of the work more distinct.




2,6
2
1
2,7
1,3
1



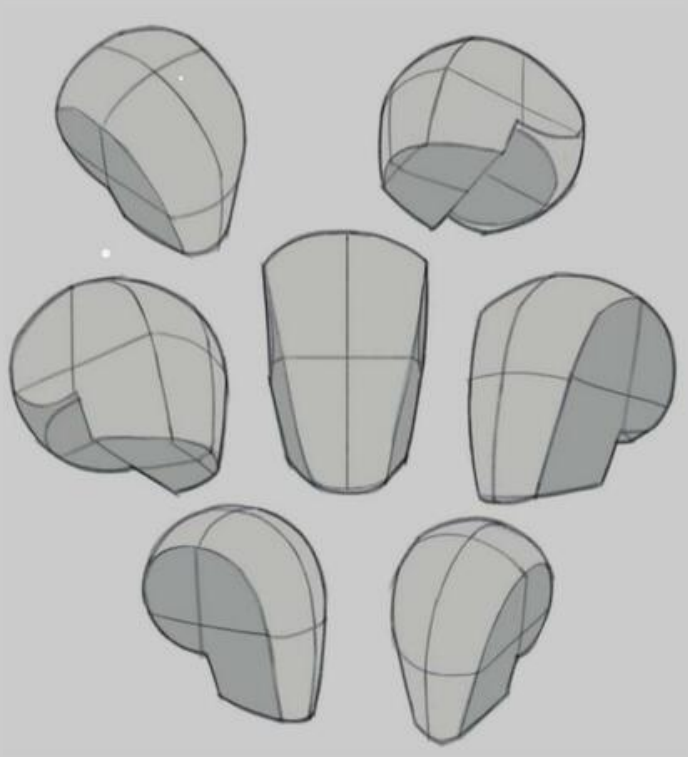
1.2 The overall shape of the head

If you want to draw a good head shape, you must deeply understand the structure of the head. The features of the head are shaped by changing the proportions of the structure.

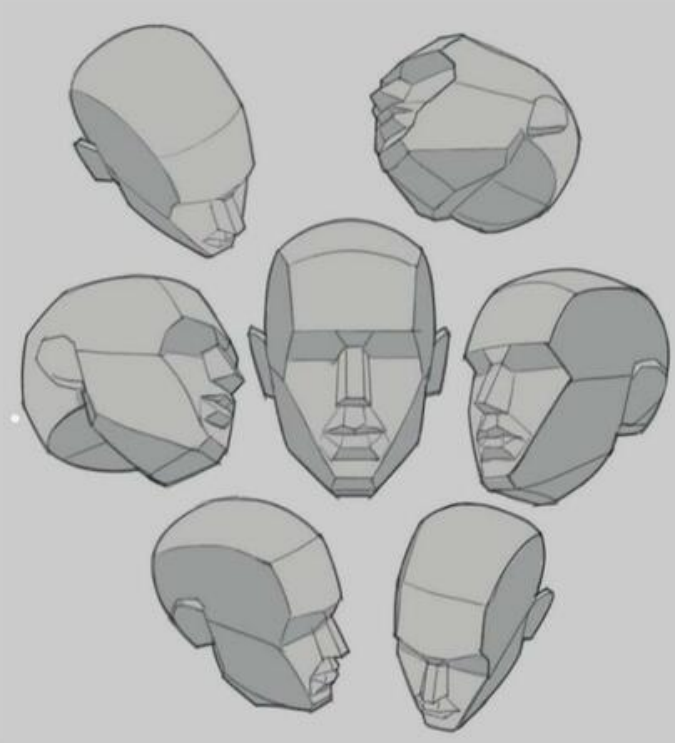
1.2.1 Analysis of the geometric shape of the head

In actual painting, the head can be analyzed from simple geometric modeling, in order to understand the basic structure of the head like a whistle.

Solve the head structure.



On the basis of the whistle, the squares representing the facial features are added to obtain a relatively complex geometric head, so that the orientation of each block can be determined when drawing light and shadow.

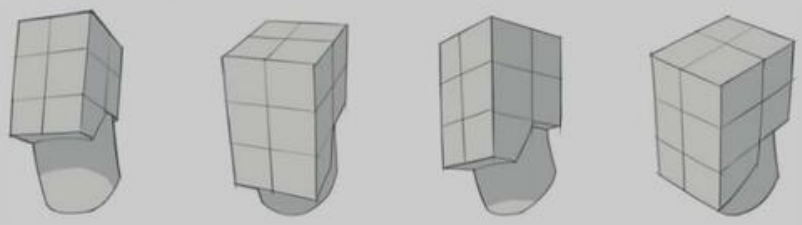


hint

When memorizing the structure of the head, the concept of "level" can be added. When practicing, you can start with a simple structure level and gradually draw a complex structure level. Note that it is necessary to memorize the deduction process rather than directly copying the complex structure hierarchy.

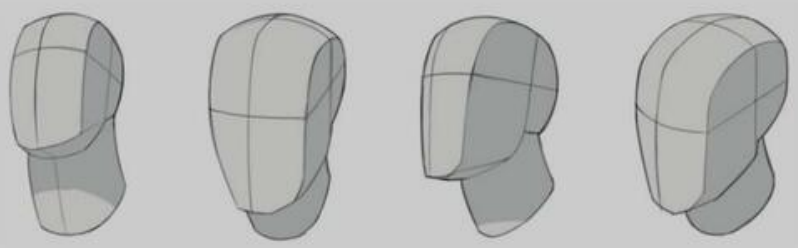
The flow of expressing the header structure is as follows.

01 When drawing a person's head specifically, the entire head and neck can be seen as a combination of a cube and a cylinder, and pay attention to the combination and interspersed relationship between the blocks.

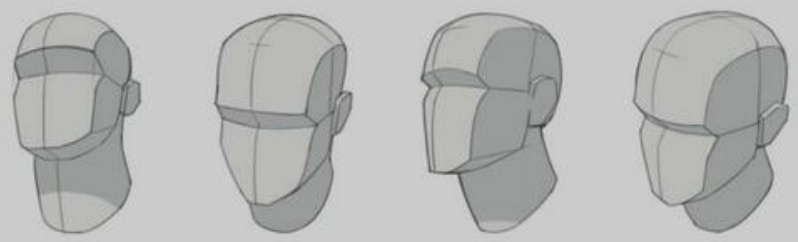


02 Cut out the shape of a whistle on the basis of the cube drawn in the previous step, pay attention to the curvature of the face

The effect of changes on perspective lines.

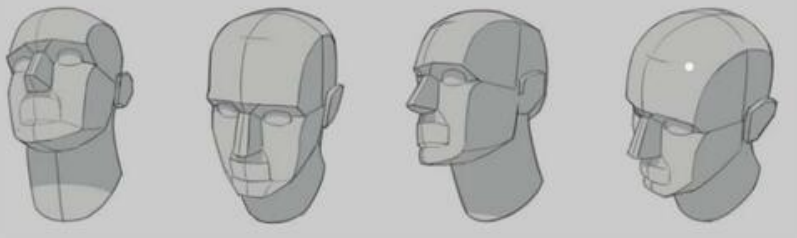


03 Enter Cut out forehead and cheeks in one step , and then add the ears.



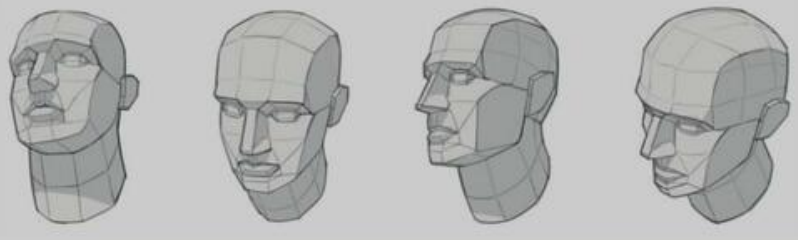
04. Draw the block that represents the nose, put the eyes into the eye sockets as spheres, and then use a cylinder

Indicates the mouth.



05 Further separate more faces, such as the upper eyelid and lower eyelid in the eye part, and the upper eyelid in the mouth part

lips and lower lip etc.



hint

The understanding and knowledge of the perspective of the cube will help to shape the heads of various angles, pay attention to the perspective relationship of the cube, and do not draw mistakes.

1.2.2 Influence of head bones and muscles on body surface performance

Mastering the geometry of the head can solve basic problems such as perspective, space, and angle.

Understanding the bone structure of the head can solve the problem of characterization of facial details. The head bones are grouped by the parietal, frontal, zygomatic, temporal, maxilla, mandible and occipital bones to make.

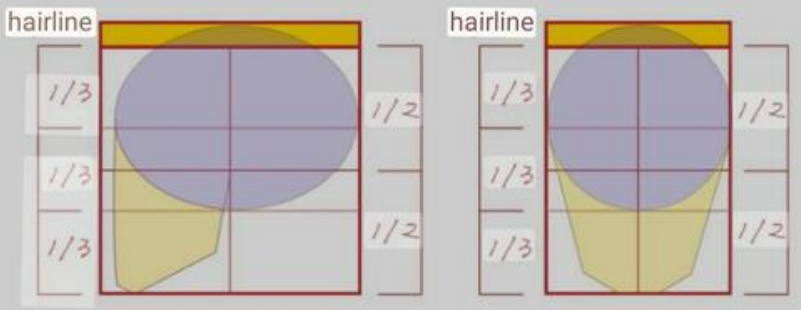
Next, combine the concept of "Three Courts and Five Eyes", through the drawing of a frontal skull and a lateral skull, to understand and get familiar with the human head skeleton.

01 Determine the overall proportions of the lateral and frontal skull (yellow area is the hairline to the skull area area).

02 Determine the position of "Three Courts and Five Eyes" in the square.

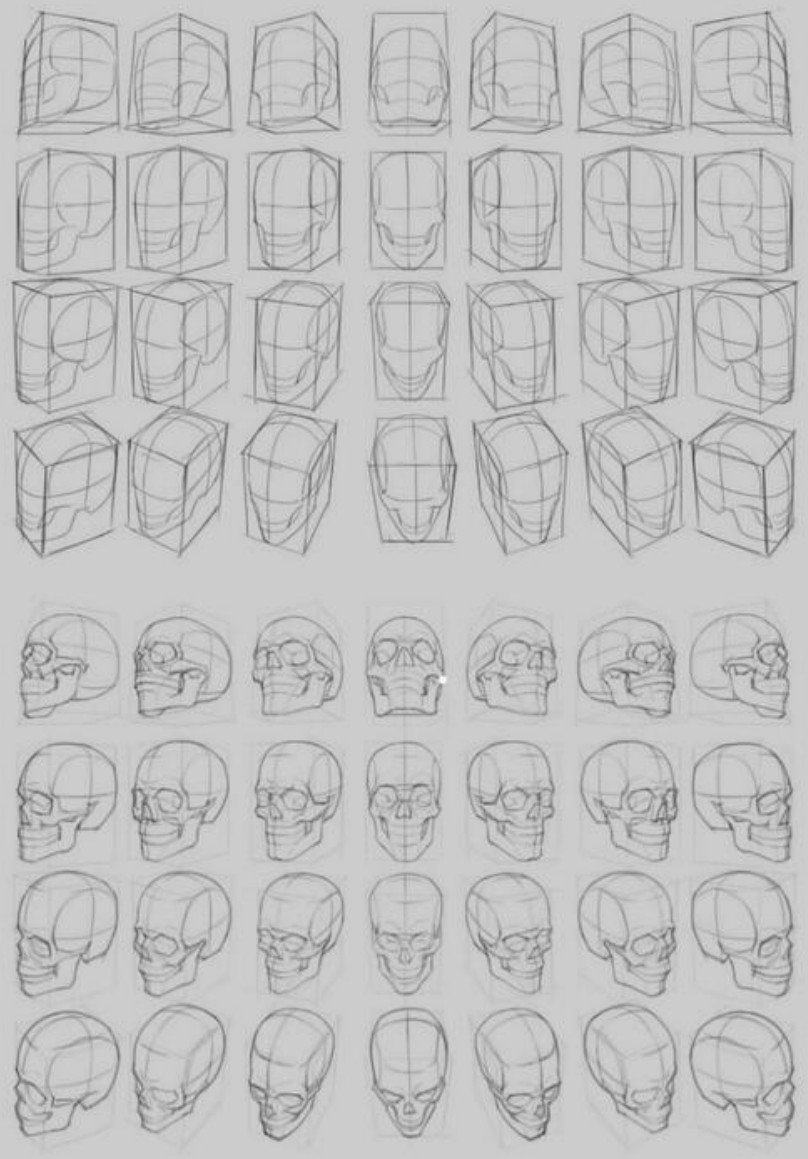
03 Outline the shape of the skull in the square.

04 Refine the structure of the skull based on the shape of the skull.

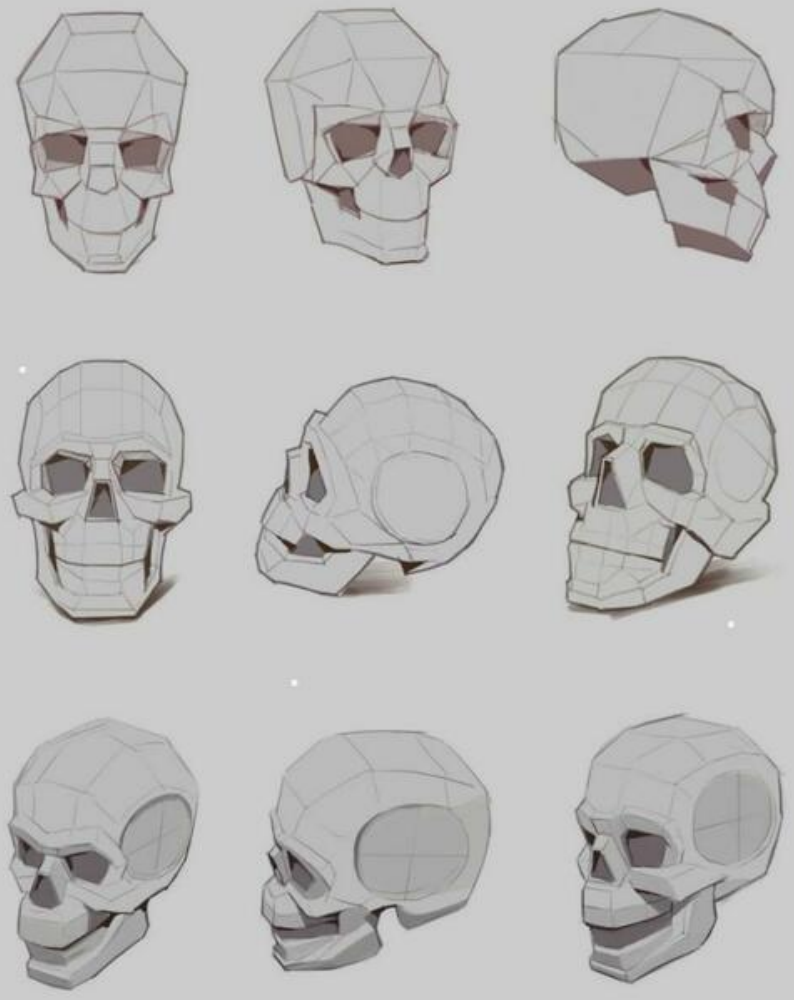


05 get A skull with the correct proportions.

The following shows the appearance of the skull from different angles.



Summarizing skulls from different angles into blocks is more helpful to understand the different shapes of the head in space state change.



The influence of the skull on facial features

The shape of the skull directly affects a person's appearance.

After mastering the basic shape of the skull, you can boldly exaggerate and deform the skull.

And draw more interesting anime characters.

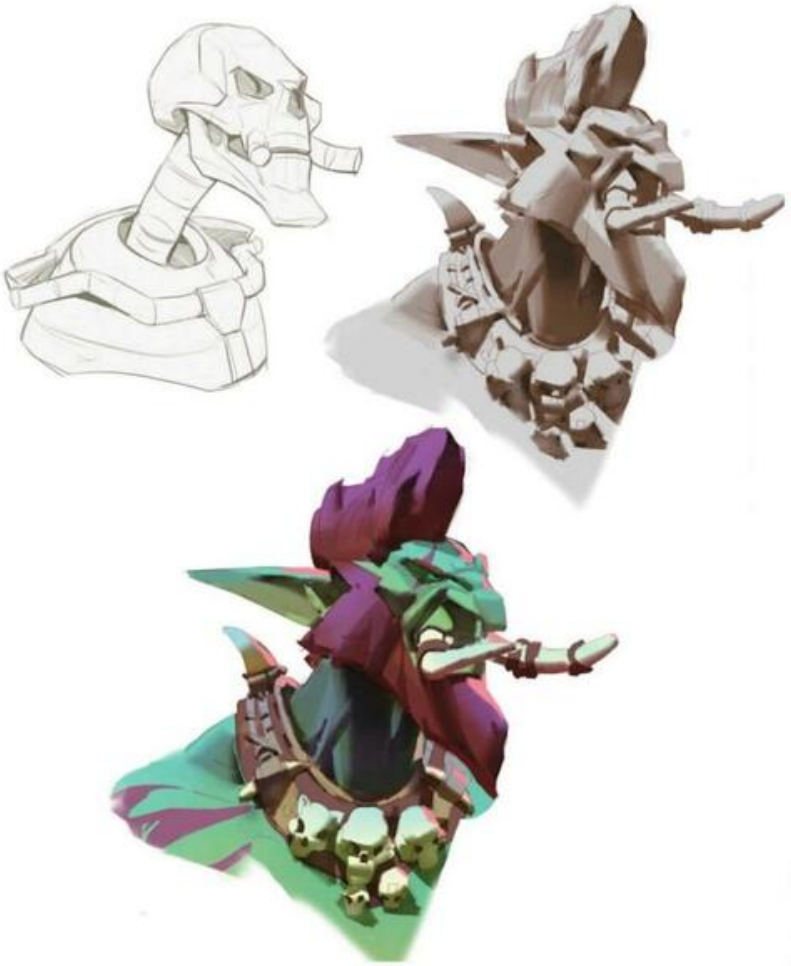
normal character head

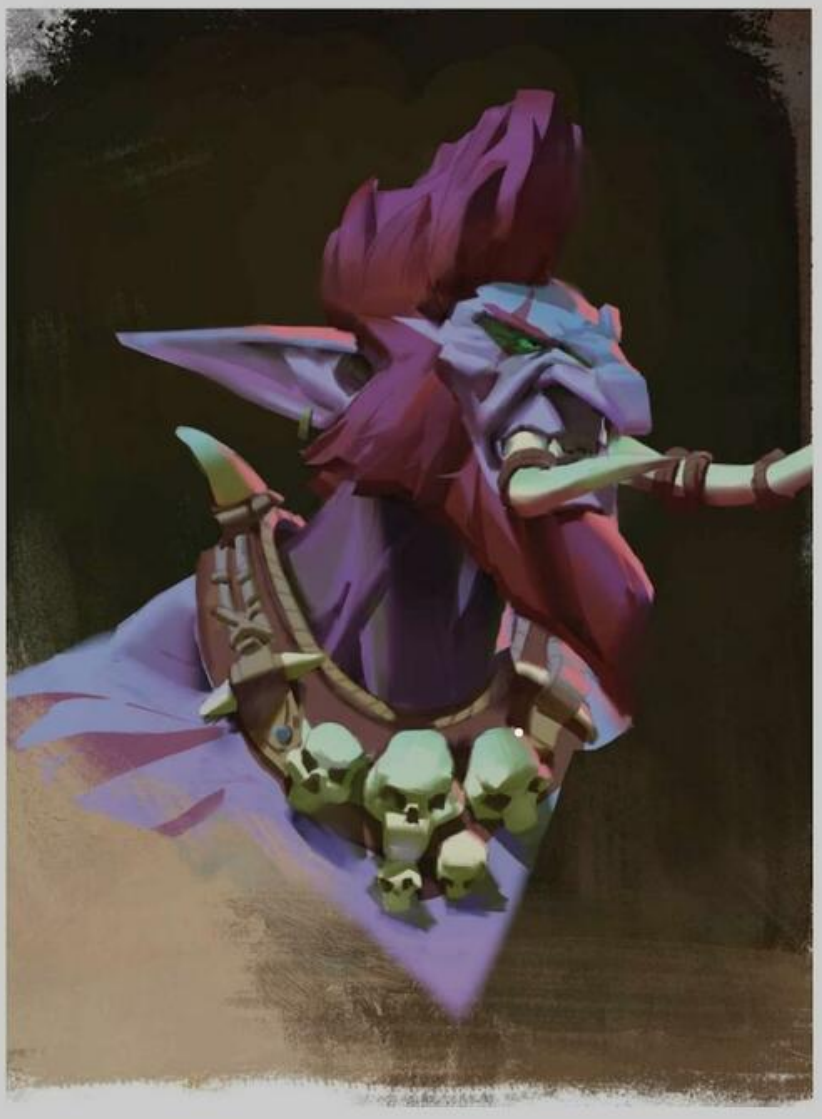
dwarf head

orc head

night elf head

troll head





Dark creature undead head

Starting from the skull, combined with the generalization of the head body, a relatively real and complex image can be drawn.

Summarizing the structure into a block understanding is more helpful to calculate the light intensity of the surface according to the orientation of the block when expressing light and shadow, so that the drawn light and shadow effect is more uniform.

After drawing the line draft, try to analyze it with light sources in different directions, you can better understand and master it head structure.

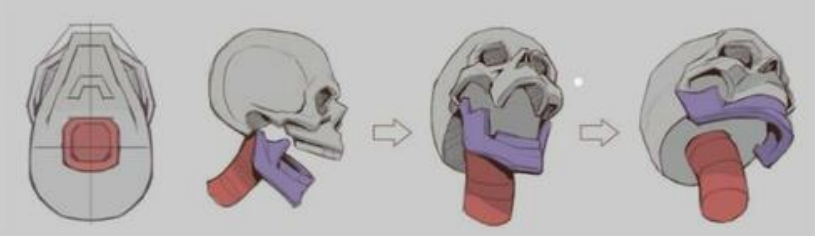
- head muscles

The muscles of the head are more complex, and the masseter muscle, orbicularis oris muscle, orbicularis oculi muscle, etc. are emphasized in memory.

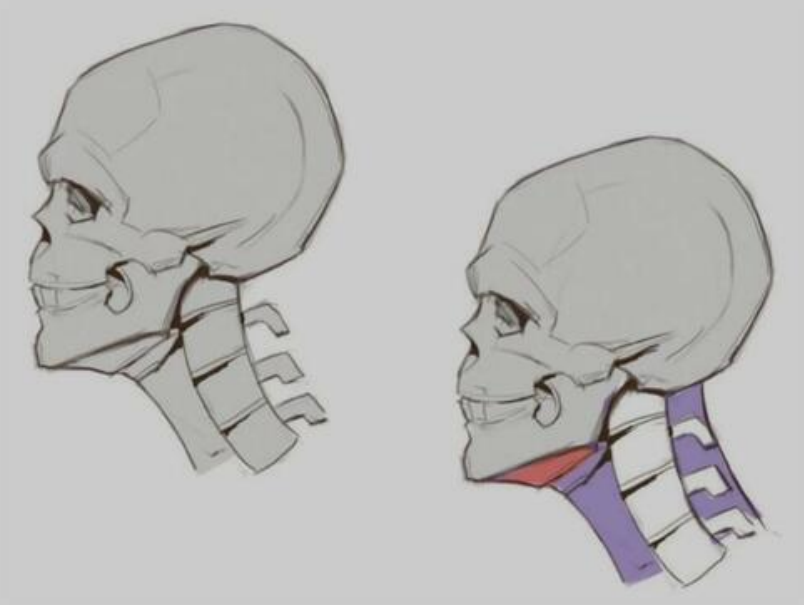
These muscles affect the contours of the body surface.

1.2.3 The connection between the head and the neck

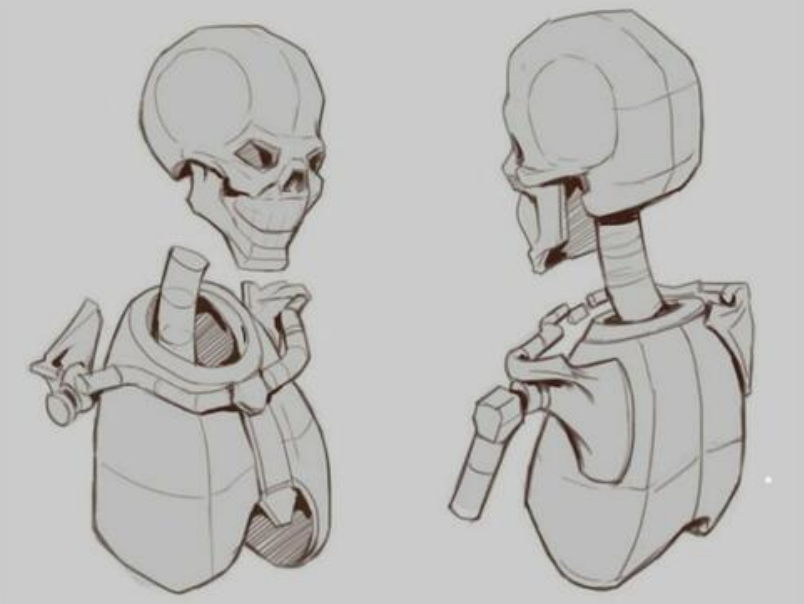
When expressing the connection between the head and the neck, it is necessary to pay attention to the connection position of the neck and the skull and the shape of the cross-section, as well as the connection structure of the mandible floor and the neck. The connection between the head and the spine is shown as follows.



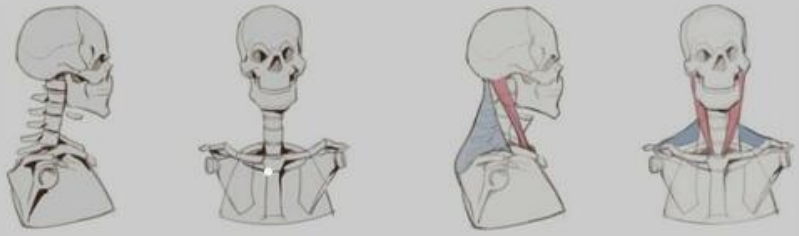
Where the bottom of the jaw joins the neck will form the red triangle area shown below.



The overall connection relationship between the head and the torso is shown as follows.



The connection between bones and muscles is shown as follows.



From the perspective of block simplification, the connection relationship between the head and the neck is understood as follows.

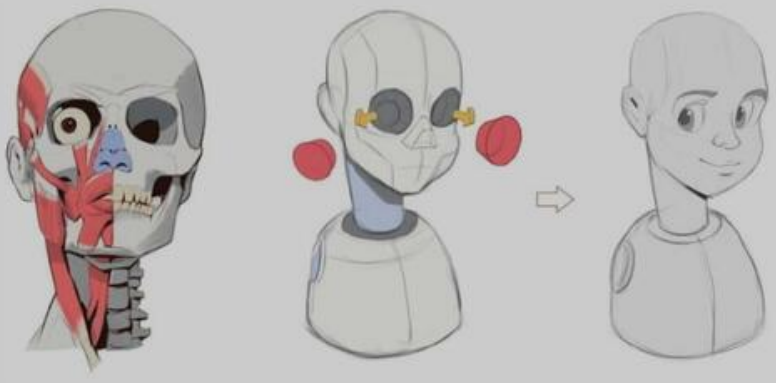
The head-neck-shoulder twist relationship is as follows.

1.3 facial features and expressions

There are many characters in cartoons. Although their appearance is exaggerated, they are all based on the structure of real characters, so it is very important to learn the relevant knowledge of the facial features and expressions of the characters.

1.3.1 Eyes

The eye is one of the important organs of human beings, and it is also a part that needs to be emphasized. In order to draw the eyes well, it is necessary to have a certain understanding of the structure of the eyes.

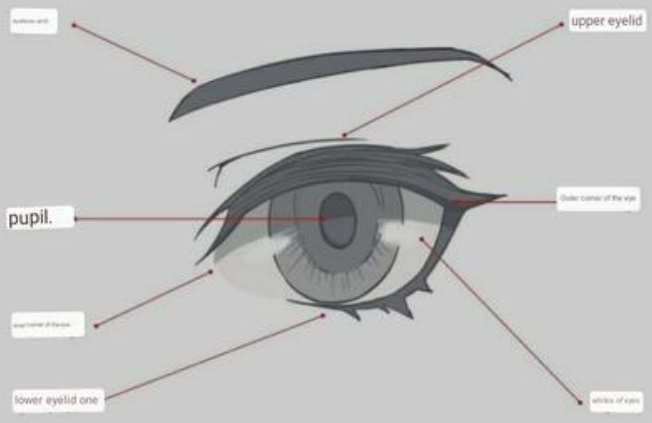


· The structure of the eye

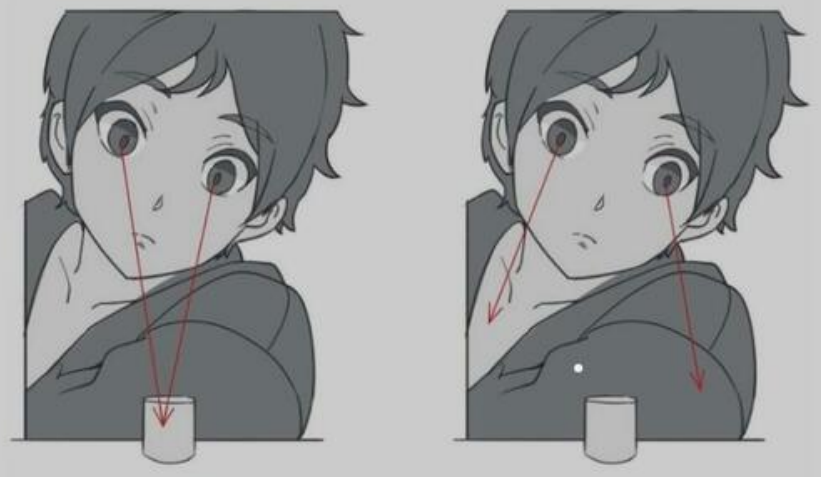
Let's first understand the basic structure of the eye.

The eye is a sphere, and the wrapping relationship of the bones around the eye should be considered when drawing. The eye structure described here includes the fluctuation of the eye and the surrounding orbit.

The eye and surrounding structures consist of the eyebrow arch, pupil, inner canthus, lower eyelid, white of the eye, outer canthus, and upper eyelid.



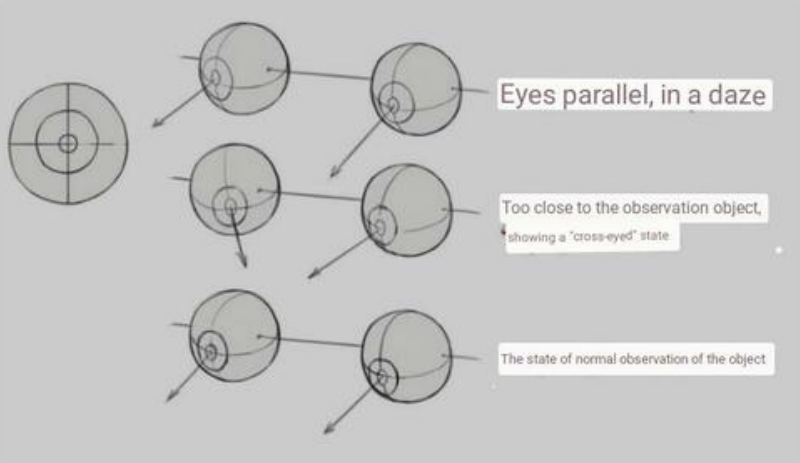
When drawing the structure of the eye, it is necessary to understand that the eyeball is embedded in the eye socket, so that the ups and downs of the eye structure can be better grasped. At the same time, the movements of the two eyeballs are basically the same. If the eyes cannot focus, the eyes will appear slack.



can focus

can't focus

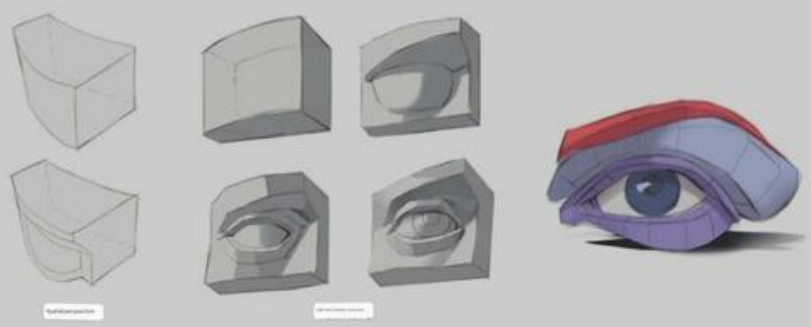
Objects that are too close to people's eyes will easily cause people to form "cross-eyed". In order to avoid the situation of "cross-eyed" or distracted eyes, the eyeballs should be represented as rotatable spheres.


Eyes parallel, in a daze
Too close to the observation object,
showing a "cross-eyed" state
The state of normal observation of the object

In terms of appearance, the eyeball is a sphere wrapped under the eyelid, so we usually cannot see the whole of the eyeball when we look at the human eye, but only a part of the eyeball, and the part of the eyeball we see is almond-shaped.

In addition, highlighting the eye structure can make the picture look more realistic, while weakening the eye structure can make the picture look more two-dimensional.

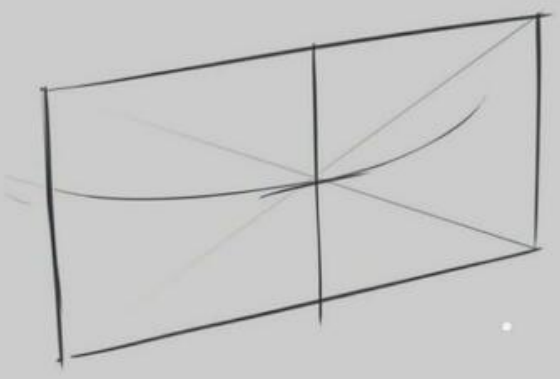
To draw the eye structure, we can start with the basic geometry, and then gradually refine the block structure, and finally draw a complex eye structure.



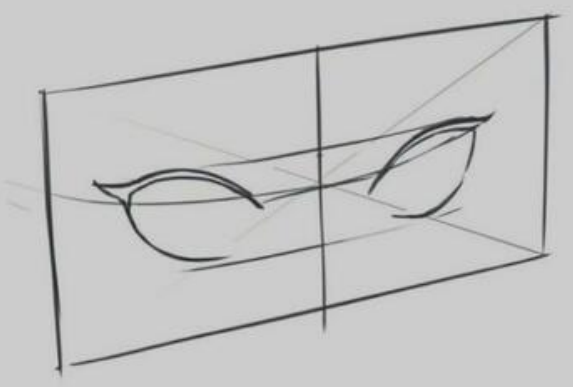
Let's take a look at the spatial perspective structure of the eye.

Because the left and right eyes of human beings are on the same perspective horizontal line, when expressing the spatial perspective structure of the eyes, the eyes can be placed in a rectangular perspective, and then the perspective changes of the eyes at various angles can be displayed. The drawing process is as follows.

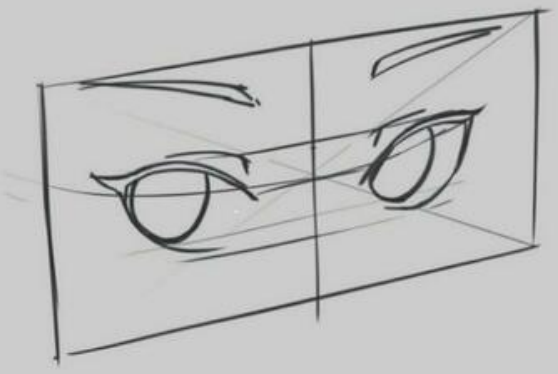
01 First draw a perspective surface, draw the bisector in the middle, and then draw a line to indicate that the face is facing direction arc.



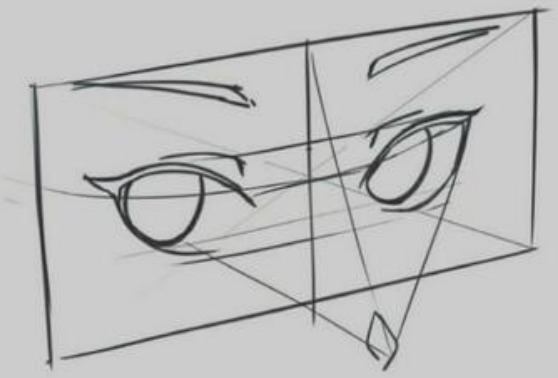
02 Determine the outer contours of the two eyes according to the perspective relationship of the faces, and the eyes should fit the arc representing the direction of the face.



03 Draw the eyeballs, the eyeballs under the influence of perspective are no longer round, but become slightly flat, and then draw the left and right eyebrows according to the perspective.

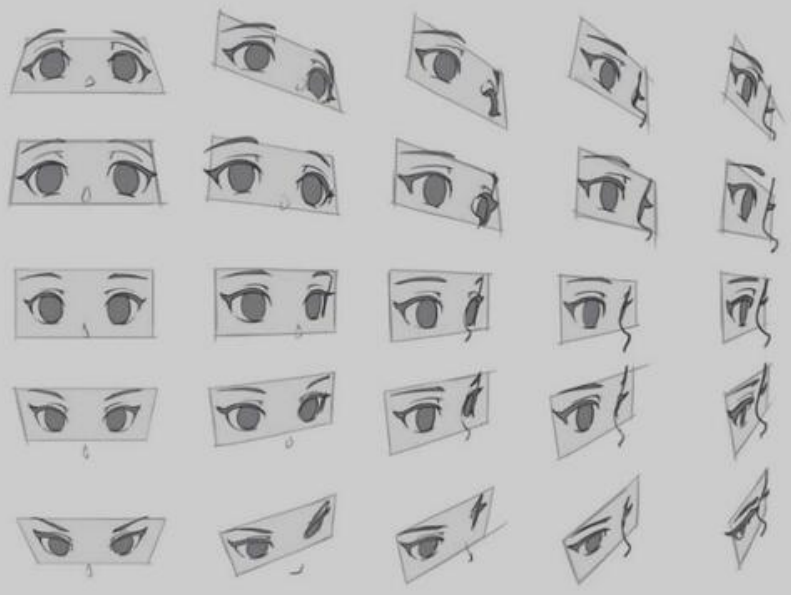


04 Draw a triangle according to the width of the eyes, and draw the position of the nose (for the second dimension style of painting).



05 Further express the structure of the eyes through a simple relationship of black, white and gray.

After learning to draw the eyes with perspective in the above way, you can practice drawing eyes with various perspective angles.

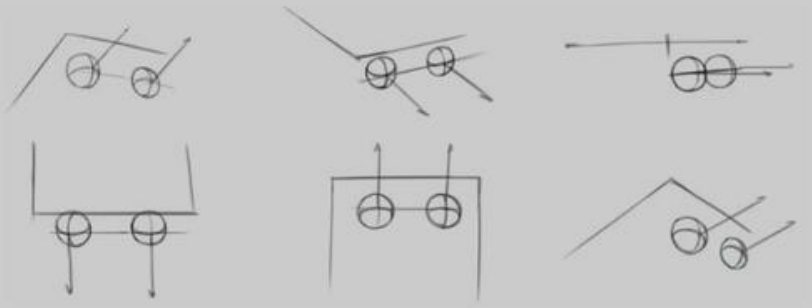


· Drawing process of eyes and surrounding structures

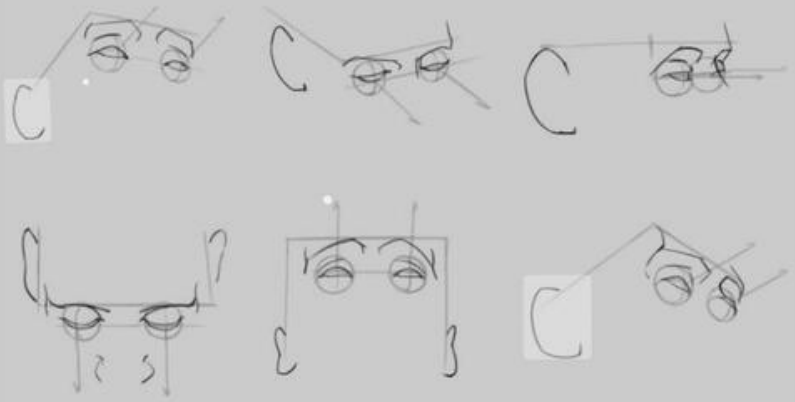
When drawing eyes, be sure to pay attention to their position on the head and perspective relationship. The drawing process of eyes and surrounding structures is as follows.

01 Determine the perspective line of the eyes. In this step, you must be aware of the square. Use the face with the eyes facing forward and the ears

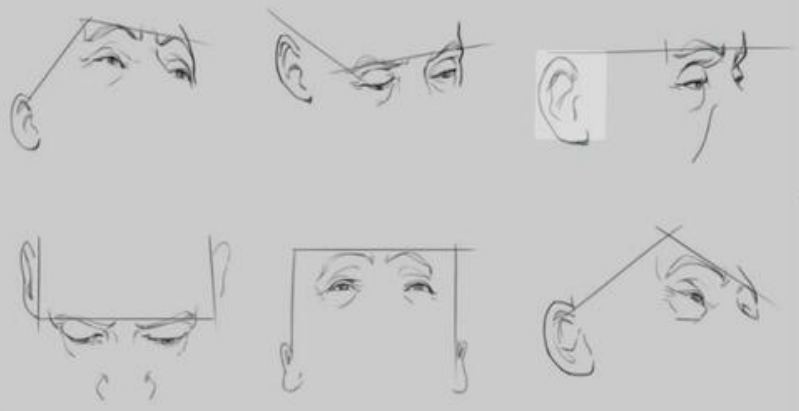
The side where it is located is a reference, and the eye is represented by a sphere to determine the viewing direction of the eyeball.



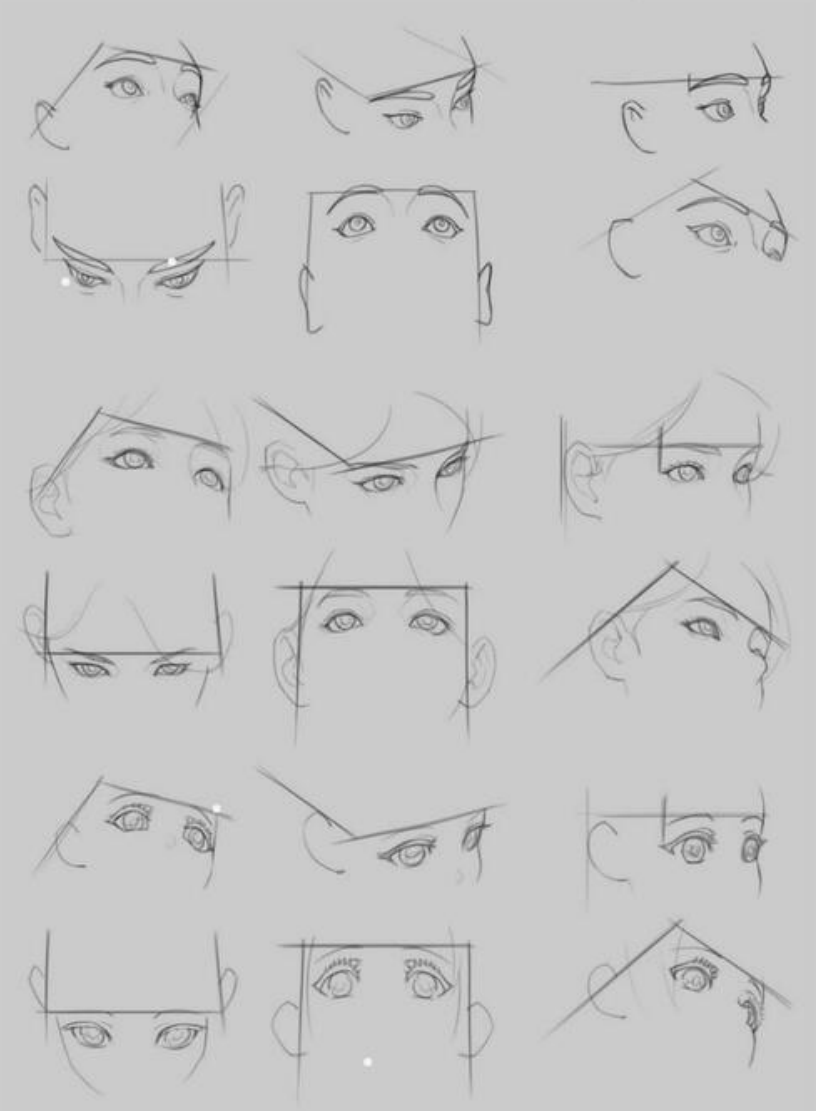
02 Pay attention to the relationship between the eyebrow bones and the eyeballs, and show the shape of the eyes clearly.



03 Draw the eyeball and draw the wrinkles around the corner of the eye according to the eye structure.



Then follow the same method to draw more forms and styles of the eyes.



·Eye expressions in different styles and angles

Eyes can best reflect a person's temperament, mainly by changing the height of the inner and outer corners of the eye, the shape of the upper and lower eyelids, the length of the eyelashes, and the single eyelid. When people make expressions, the shape of their eyes changes.

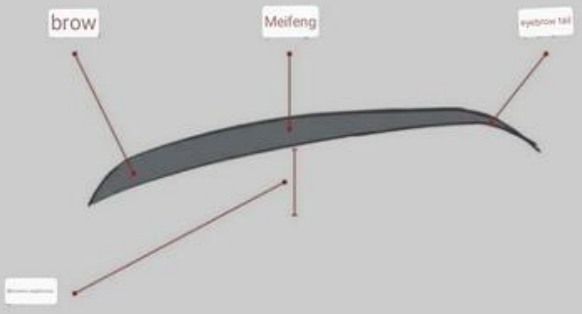
1.3.2 Eyebrows

The shape and position of the eyebrows can highlight the character of the character, emphasizing the portrayal of the eyebrows, can further strengthen the character of the character.

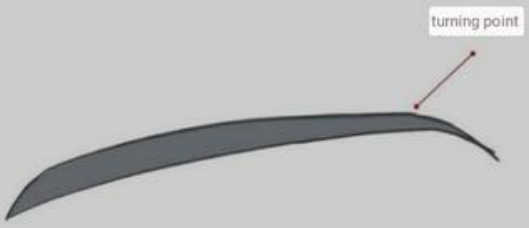
- structure of eyebrows

The structure of eyebrows is divided into eyebrows, eyebrows, eyebrows and eyebrows.

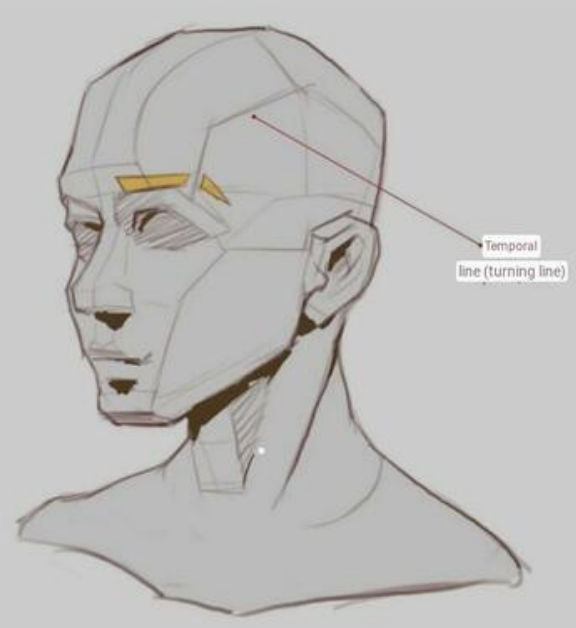
The gap between the eyebrows refers to the distance between the eyebrows and the eyes. Generally, the gap between the eyebrows is about the width of an index finger.



It should be noted that the eyebrows will inevitably pass through the temporal line when they are attached to the bone. The temporal line is the turning line on the skull, so the turning will also occur at the peak of the eyebrow.



Temporal line: extending from the brow bone to the top, it is an important turning line between the two planes from the forehead to the temple.



The above-mentioned content also applies when showing some stylized characters.

hint

The drawing method of eyebrows is relatively simple, and the drawing process of eyebrows will not be explained in detail here. For the drawing of eyebrows, it is only necessary to show the eyebrow shapes of different styles and angles on the basis of understanding its basic structure.

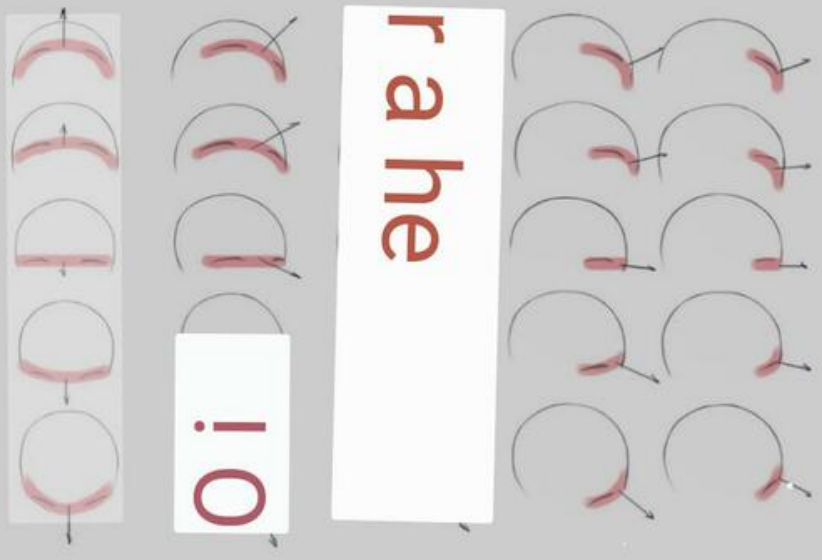
• Different styles and angles of brow expression

The eyebrows are attached to the brow bone, and there are many types of eyebrows. The eyebrows of the corresponding shape can be drawn according to the character's personality.

The description of eyebrows is mainly from the length, thickness, as well as the radian of the eyebrows, eyebrow peaks and eyebrow tails.

Get points.

The eyebrows should fit the structure of the head and conform to the laws of perspective.



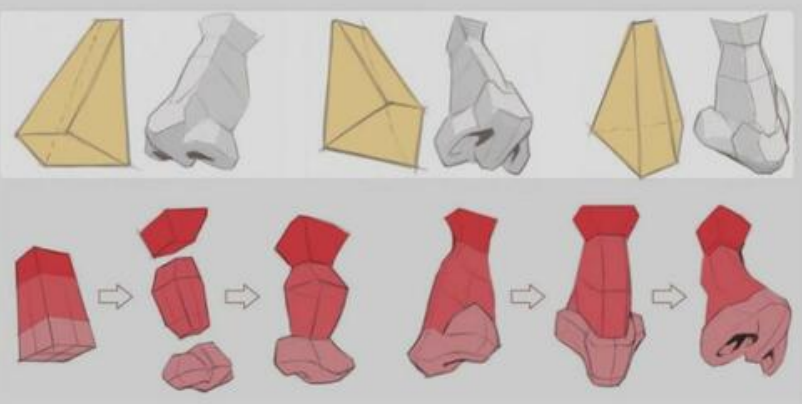
1.3.3 Nose

The nose is located in the middle of the face, so it should be emphasized in realistic painting. When drawing characters in two-dimensional style, in order to highlight the eyes, the nose can be drawn simpler.

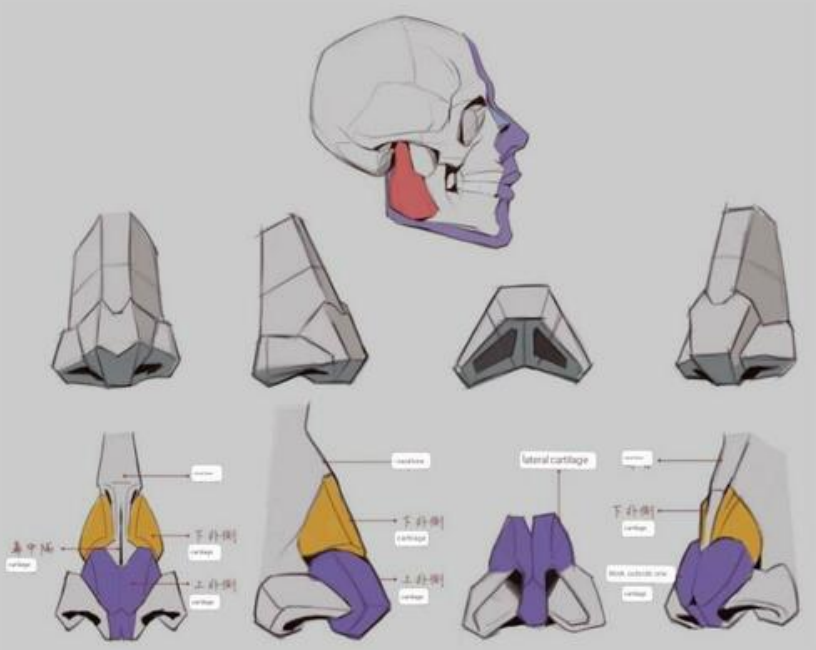
The structure of the nose

The nose is mainly composed of nasal tip, nasal columella, nostrils, nasal root, nasal bridge, nasal dorsum, nasolabial fold and nasal alar.

The nose as a whole is like a three-dimensional trapezoid with a clear facing face. Continue to refine the trapezoid to get a more precise nose shape.

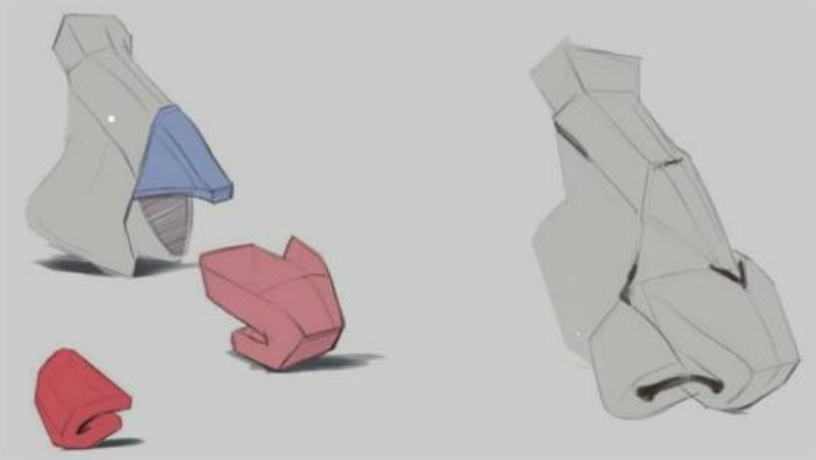


The nose is in the middle of the face, and it plays the role of indicating the direction of the character's head.



There is a lot of cartilage on the nose, some of which are movable.

After understanding the basic structure of the nose, you can analyze the light and shadow of the nose according to the light-receiving surface, and you can better draw a sketch with a clear structure.



nose structure

Light and shadow exercises

• nose drawing process

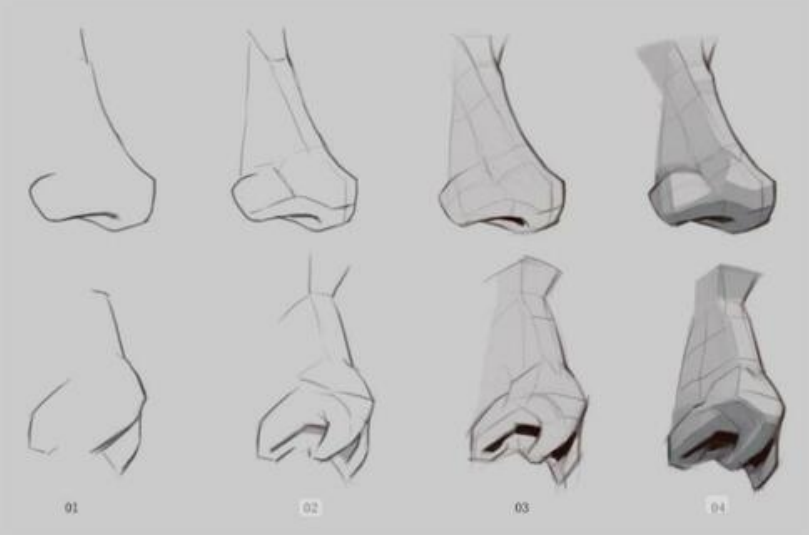
The nose drawing process is as follows.

01 Draw the geometric outline of the nose at different angles (pay attention to the perspective relationship).

02 Subdivide the structure of the nose according to the geometric outline.

03 Fill the nose with shades according to the shape drawn.

04 Deeply portray the nose to make the nose more three-dimensional.



Then follow the same method to draw more forms and styles of the nose.

• Different styles and angles of nose performance

If you want to draw a nose from all angles, you must master the perspective relationship of the nose. First observe the position of the nose base of the nose at all angles, and shape it through the outline of the nostrils or the wings of the nose. Then describe the shape and size of the nose and the fluctuation and length of the bridge of the nose. Finally draw the shadow for the nose.

For the characterization of the nose, special attention should be paid to the performance of the bridge of the nose, the tip of the nose and the nostrils. The tip of the nose on the front and side is generally larger, while the nose on the side becomes larger at the bridge of the nose. will be more.

Different types of nose contours can reflect different personalities.

hint

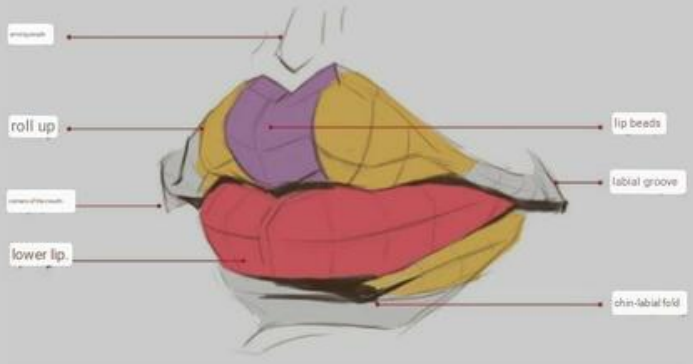
When drawing the head of a character in a two-dimensional style, in order to highlight the eyes, the structure of the nose is generally weakened, making the nose appear smaller.

1.3.4 Mouth

The mouth can perform complex movements. When expressing characters, they can portray various expressions by adjusting the mouth and eyes. Because of this, the mouth is also a complex and difficult part to draw.

- The structure of the mouth

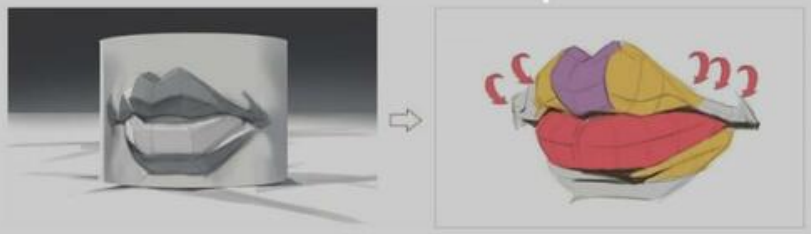
If you want to draw a mouth that does not appear flat, then you need to understand and express the structure of the mouth. The structure of the mouth can generally be divided into upper and lower lips, lip beads, mouth corners and people.



For the structural representation of the lips, draw a curve along the teeth, thicker towards the center, with the upper lip on the lower lip. So the lower lip is narrower than the upper lip and not as prominent as the upper lip. Also, there will be shadows at the corners of the mouth. The bulge in the middle of the upper lip is the lip beads, and the sides of the lip beads will also bulge slightly. The lower lip is only slightly bulged in the left and right places, and the middle is slightly sunken.

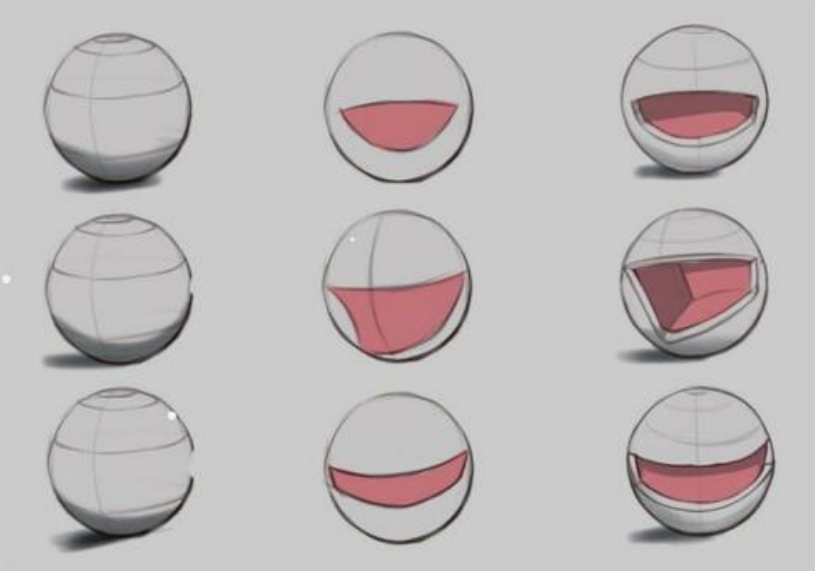
The mouth is a relatively soft part, pay attention to the vertical ups and downs of the mouth, and pay attention to the three-dimensional effect of the mouth when drawing.

The cross-section of the mouth is an arc, so pay attention to showing it when drawing, and pay attention to the corners of the mouth change at turning point.

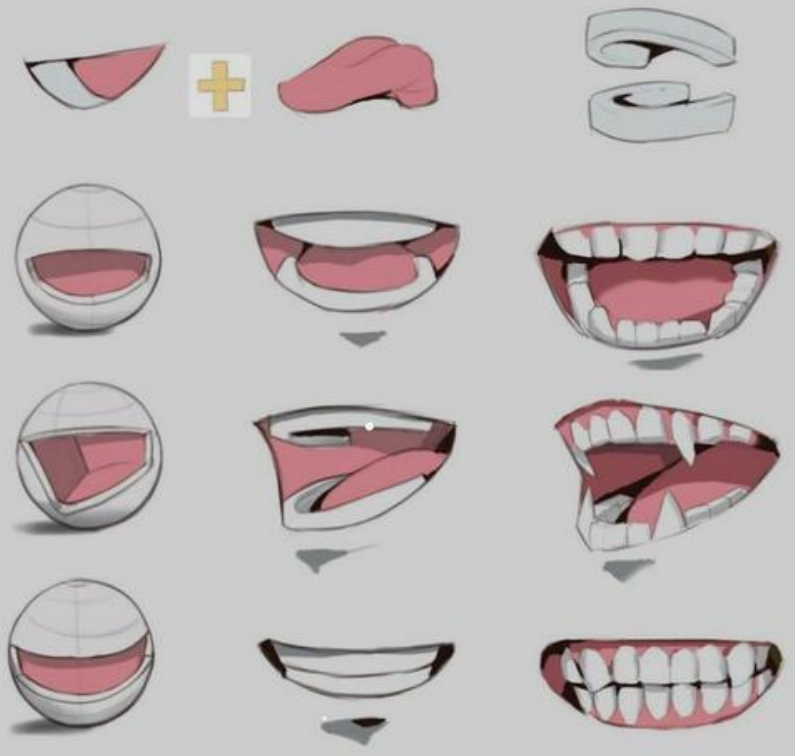


When drawing the mouth, the lips are rarely drawn, and more general expressions of the mouth are drawn. Shapes (except for drawing realistic mouths). Think of the mouth as a sphere, the mouth is drawn on the sphere, and the angle of the sphere will vary

Change the shape of the mouth.



Once you understand the overall structure of the mouth, you also need to understand the internal structure of the mouth. The internal structure of the mouth includes the teeth, tongue and gums. When drawing, you can draw these structures first, and then carry out in-depth characterization.



- Mouth drawing process

The process of drawing the mouth is as follows.

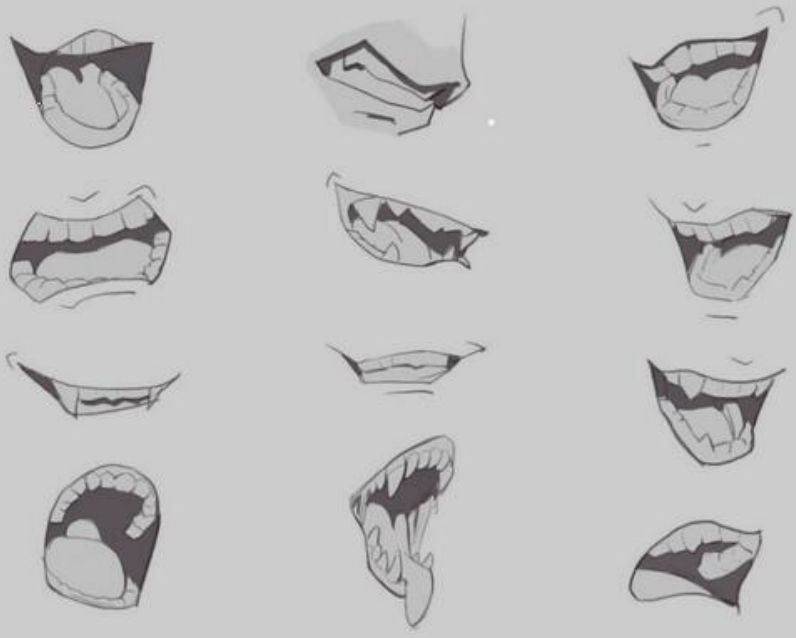
01 Draw spherical structures at different angles.

02 Draw the shape of the mouth on the basis of the spherical structure, and compare the top and bottom angles degree of mouth.

03 Draw structures such as teeth and tongue to make the mouth more complete.

- Mouth expressions in different styles and angles

When most people express the mouth, they usually use a simple line to represent it. Only when the mouth is open will they draw the internal structure of the mouth. In the two-dimensional style of the mouth, the upper and lower lips are rarely drawn.



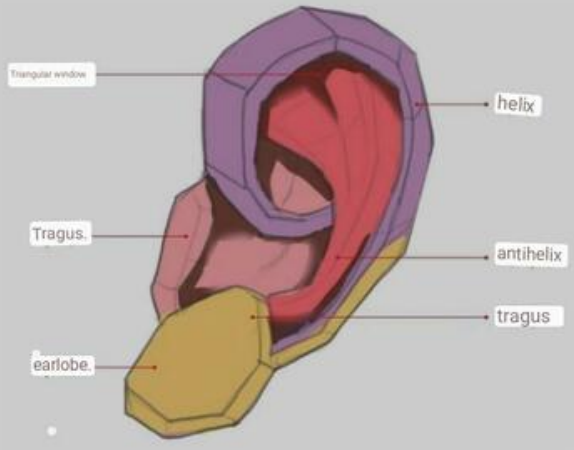
1.3.5 Ears

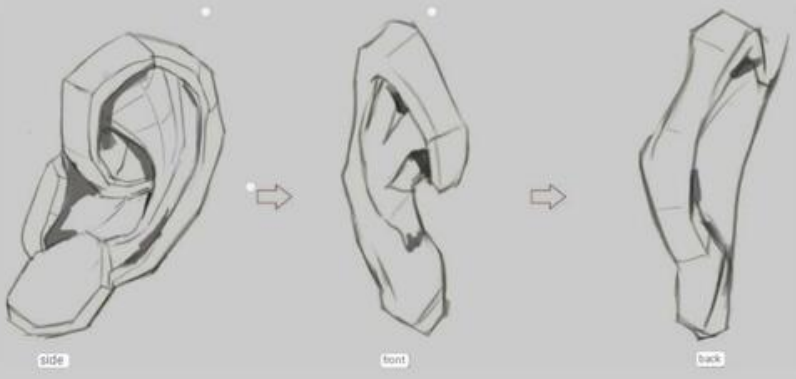
The ear is composed of the inner and outer helix, the antihelix, the tragus, the antitragus and the earlobe. Except for the earlobe, which is fat, other parts are cartilage tissue. The ears are generally wide at the top and narrow at the bottom, with a concave bowl in the middle.

- The structure of the ear

The ears are the most inconspicuous part of the five senses and are located on the sides of the head. Longitudinal, the ears are in the middle of the head.

For those who are just learning to draw portraits, the structure of the ear is relatively complex. In order to facilitate memory, the ear can be divided into several simple blocks to understand.





●Ear drawing process

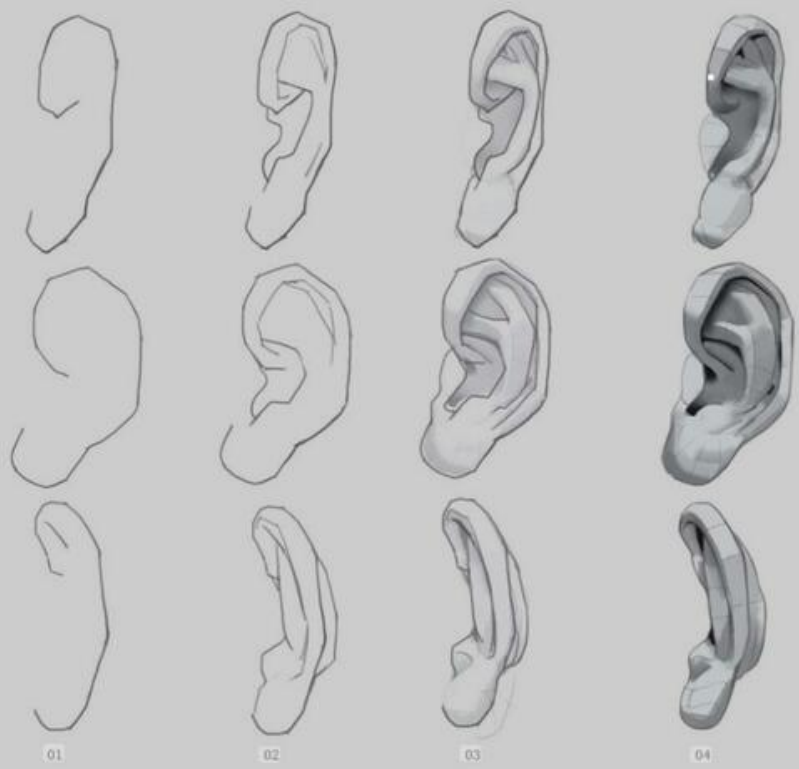
The ear drawing process is as follows.

01 According to different angles, draw the simple geometric outline of the ear, paying attention to the perspective relationship.

02 According to the geometric outline, refine the structure of the ear.

03 According to the shape of the ear, fill the outline of the ear with two-tone tones.

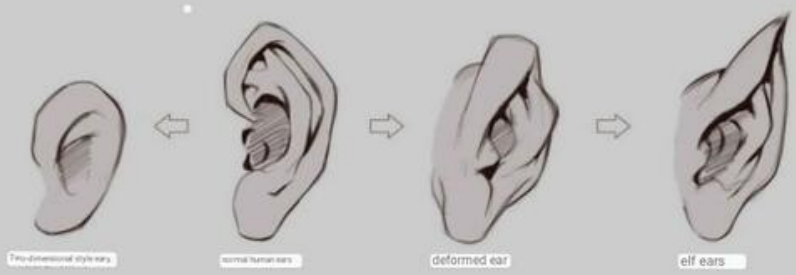
04 Deeply describe the structure of the ear to make the ear more complete.

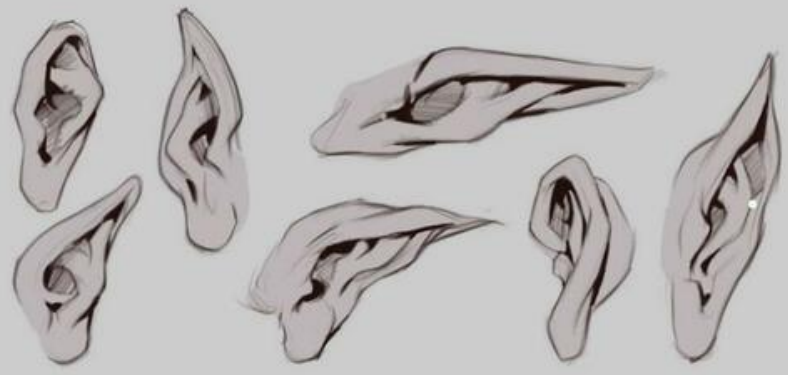


·Ear performance of different styles and angles

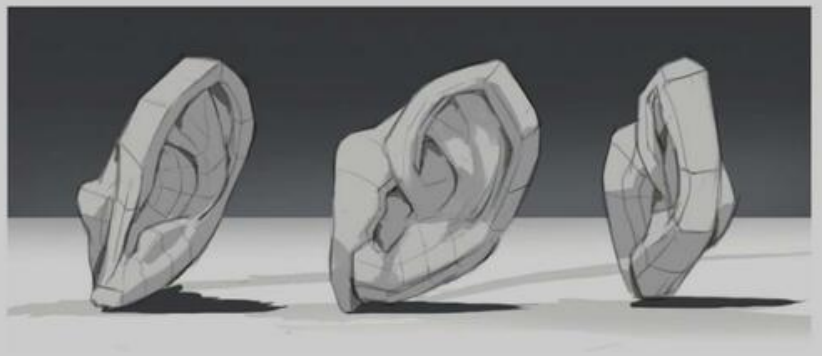
The different angles of the normal style ears are shown below.

The ears of the elf in the two-dimensional style and the magical world are evolved on the basis of the structure of the ordinary style ear.





When actually drawing, pay attention to the light and shadow changes of the ears at different angles.



1.3.6 Expression

Human expressions are changeable, and each expression has a certain pattern of facial changes. But due to People's looks and personalities are different, and the expressions shown by different people will also have certain differences.

The changes of human facial expressions are mainly reflected in the morphological changes of eyebrows, eyes and mouth. By adjusting the shape of the facial features, a rich character expression can be shown.

The following six basic expressions of joy, anger, sadness, surprise, fear, and disgust (contempt) are used as examples for demonstration and analysis.

Joy: When people are smiling, their faces will stretch out. Therefore, when drawing such expressions, it is necessary to increase the distance between the eyebrows and the eyes to show the relaxed state of the characters. In addition, the corners of the people's mouths should be drawn upturned.

Anger: When a person is angry, the main feature of the face is that the distance between the eyebrows and the eyes is relatively close, the eyebrows are upturned, showing a tense state, and the pupils are constricted and appear relatively small.

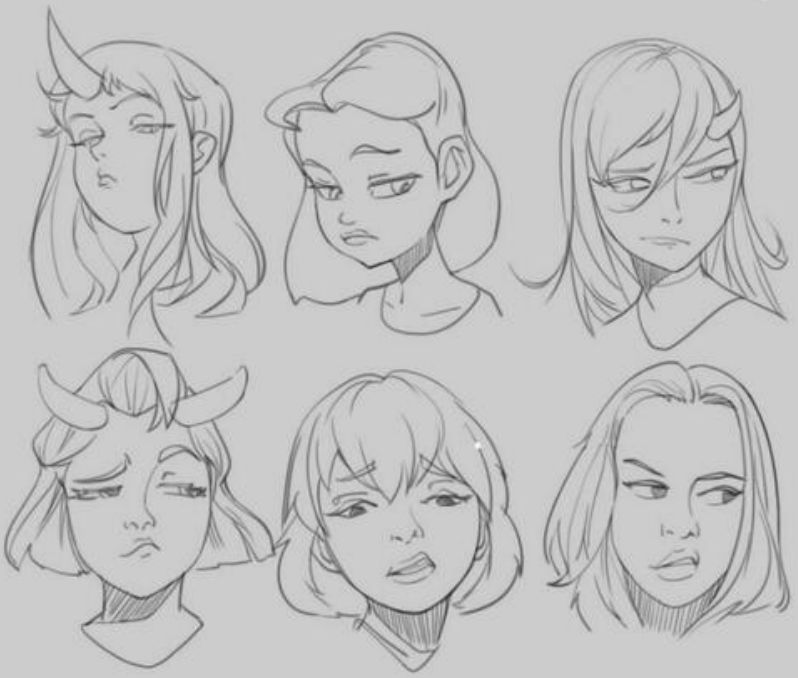
Sorrow: When people are sad, their eyebrows are generally in the shape of an "eight", and their eyes can be rounded, lowered,

or absent-minded. Matching and other special expressions will make the sad expression appear more delicate and subtle.

Surprise: When people are surprised, their eyes are round, their pupils are narrowed, their eyebrows are generally far away from their eyes, in the shape of an "eight", and their mouths are mostly open.

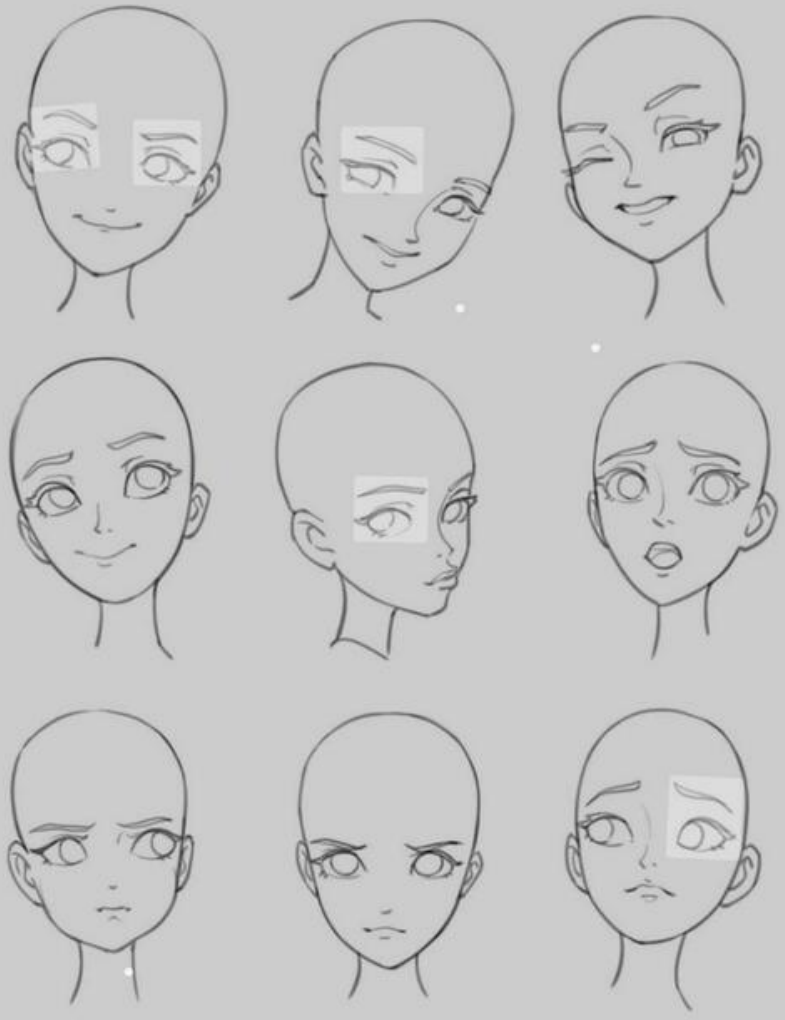
Fear: When people are afraid, they will frown because of emotional tension. Compared with the surprised expression, the eyebrows are closer to the eyes, the mouth is closed, and the pupils are constricted. Some fine sweat can be drawn on the face to express excessive fear. generated tension.

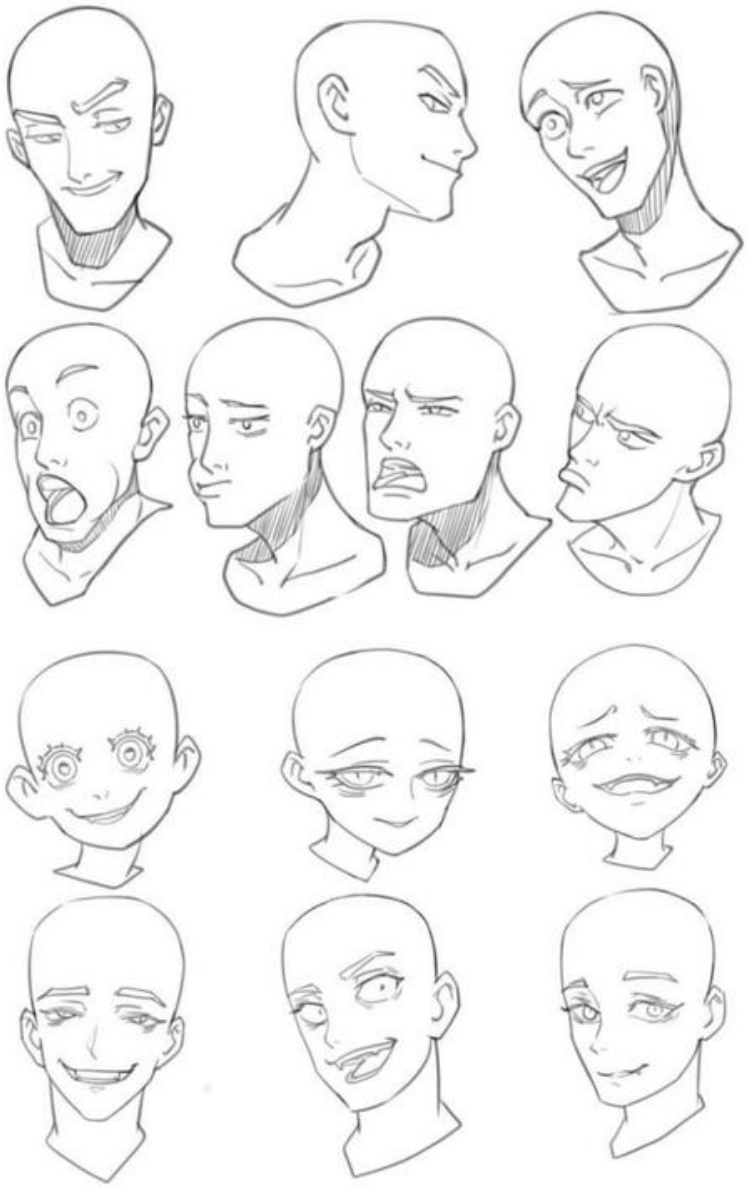
Disgust (contempt): When people have this type of expression, they often show a feeling of disdain, the eyes are slanted to one side, the mouth is pouted, and the eyebrows generally change in height.

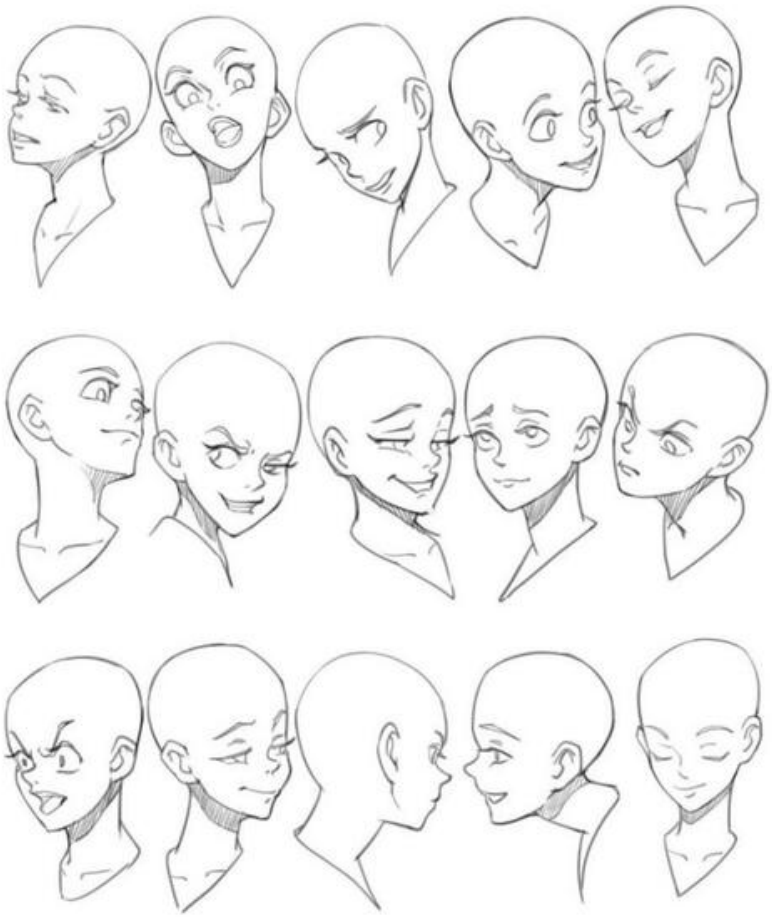


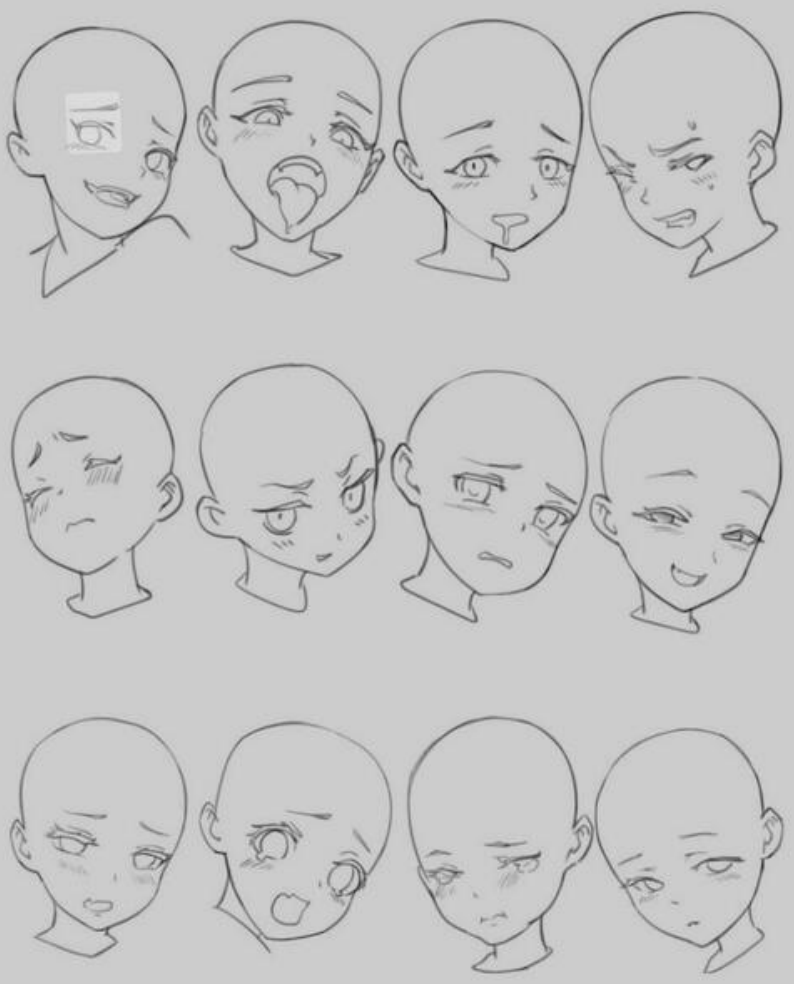
In addition to the previous common expressions, there will also be expressions produced by the fusion of two emotions, such as fear (surprise + fear), wry smile + sorrow) and so on.

In addition, there are some expressions that are very subtle. In actual painting, if you want to express the faces of the characters more vividly, you should pay more attention to the subtle changes in facial expressions, focus on depicting the eyes, eyebrows and corners of the mouth, and at the same time pay attention to controlling the distance of the facial features.









1.4 Hair

A good character should be memorable. The shape of the hair is very critical when shaping the character, and the shape of the hair is even as important as the portrayal of the face.

1.4.1 Cognition of hair

The following three aspects to explain the hair.

The division of hair and the wrapping relationship between hair and head

Hair is generally divided into bangs area, side hair area and back hair area.

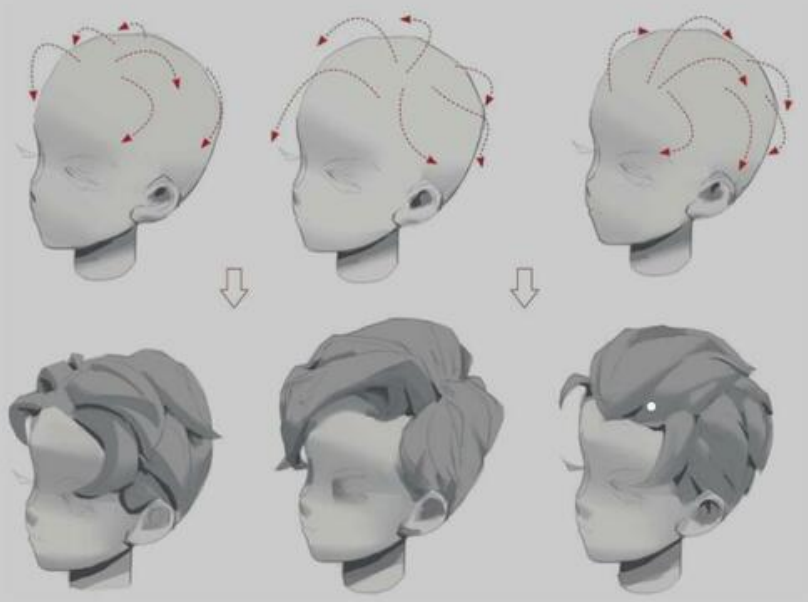
It is also different, some hairstyles may have no or less partitions (for example, some hairstyles have no bangs, and the side area and the back of the head area of a single ponytail hairstyle are integrated into a whole).

In addition, it is necessary to understand concepts such as hairline, spin and midline of hair.

When expressing hairstyles, the midline of the hair can be adjusted in design.

Once the midline is determined, the direction in which the hair extends on the head can be designed according to the growth characteristics of the hair.

to.



The hair sections on the side and back of the head are related to the head wrap as follows.

- The position and shape of the hairline

The shape of the hairline is related to the scalp (area where hair grows) that covers the skull.

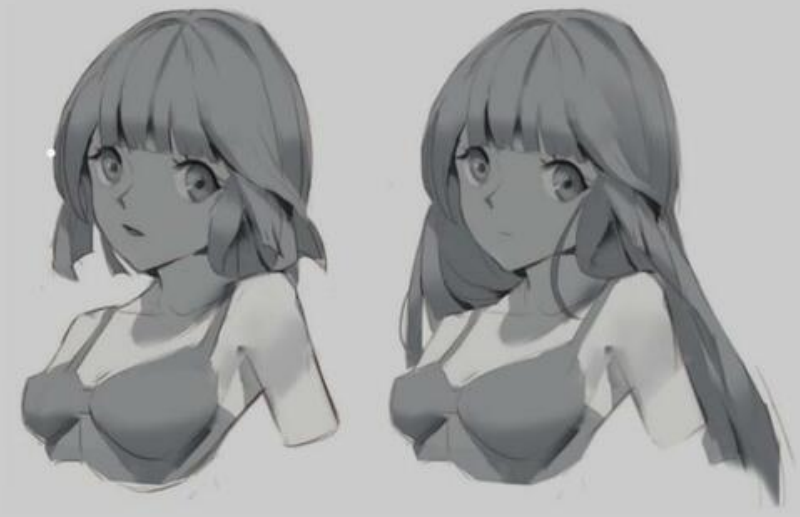
Everyone's scalp shape is different and can be adjusted appropriately when drawing to show different styles of characters.

In addition to the different shape of the hairline will have a greater impact on the character, the difference in the position of the hairline will also have an impact on the character. For example, the hairline of children and the elderly is higher, and the hairline of ordinary young people is slightly lower.

The effect of hairstyle on the character

When expressing different characters, if you have no idea about the character's hairstyle, you might as well start with the character's character, and match the character with the appropriate hairstyle according to the character's character and temperament.

Generally speaking, short-haired girls are more lively and cheerful, while long-haired girls will appear More quiet and dignified.



The length of male hair can also reflect the different personalities of the characters. Men with short hair appear more sunny and straightforward, while men with long hair appear more quiet and calm.

In addition to the length of the hair that will affect the character's image style, different styles of hair will also Change the character's image style.

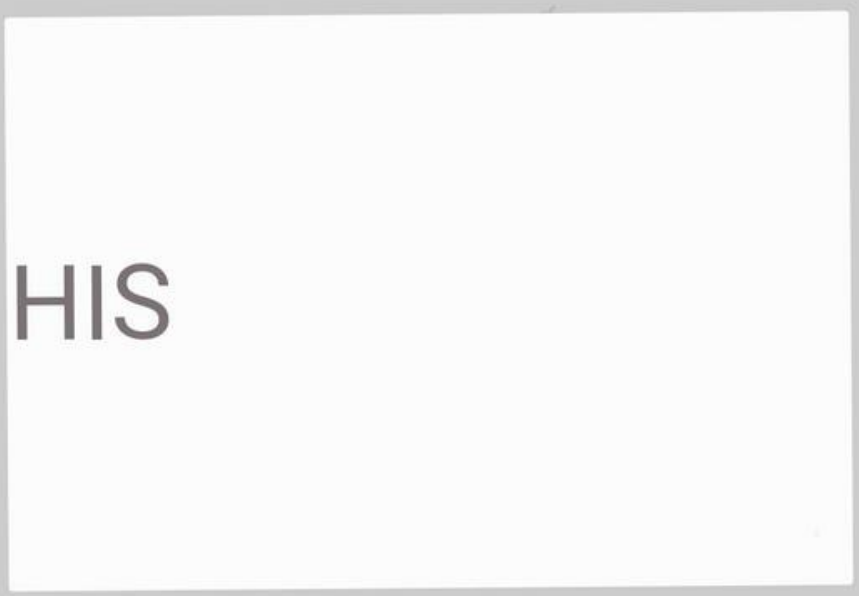
For example, a girl with a high ponytail will look younger and more energetic, while Other hairstyles may give people a relatively mature and demure feeling.

1.4.2 Basic morphological performance of hair

The basic shape of hair is explained below.

- Drawing of a single strand of hair

A single bundle of hair is a small unit that makes up a hairstyle, and the shape of the hair bundles composed of different hairstyles is also different. When drawing a single strand of hair, pay attention not only to the orientation of the hair, but also to the changes in the thickness and curvature of the hair.



When arranging and combining a single bundle of hair, it is necessary to grasp the relationship between the root and the hair.

Especially when drawing exaggerated hairstyles, expressing the relationship between the roots and strands can make the hairstyle look more realistic.

• Drawing of different shapes of hair

Here, we mainly take flying hair as an example to show the performance of different shapes of hair. When drawing flying hair, consider the direction of the wind and the effects of gravity. Design the curvy trend of the hair first, and then draw the tresses along the trend.

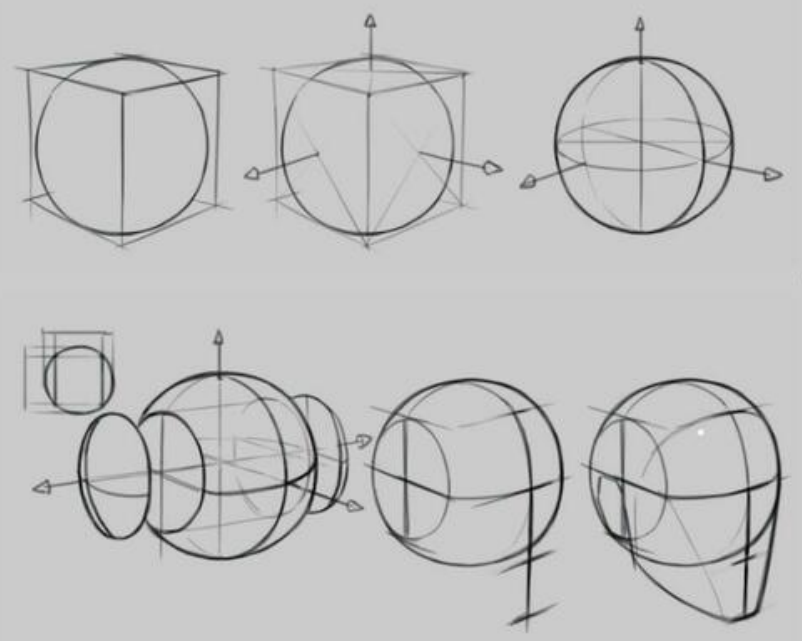
1.5 Dynamic performance of the head

If you want to draw the head rotation dynamics of various angles, you must first understand the basic model of the head. build method.

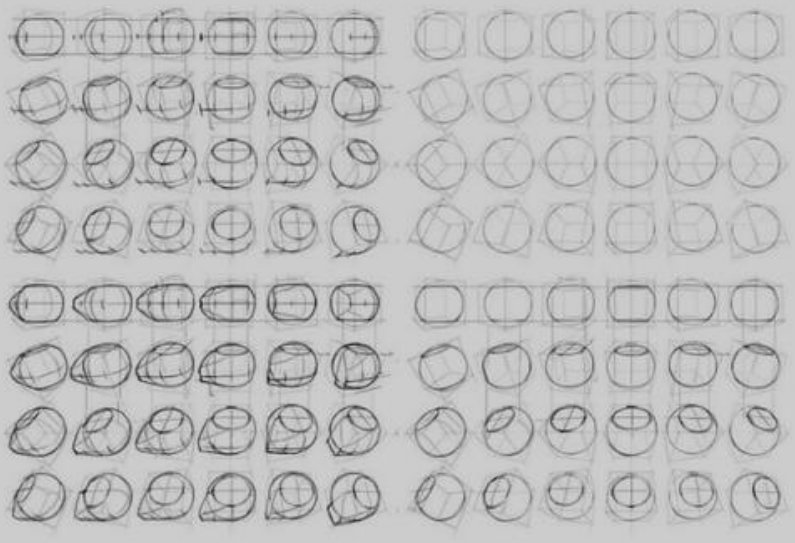
Here is one of the ways to build a model.

The first step in the building process is to establish a block awareness. The most common problem with drawing the head in a circle is that the orientation of the face is not clear, and by "sleeping" the circle into the square, the perspective relationship and orientation of the face can be clearly defined.

During the drawing process, pay attention to the size and proportion of the small circle on the side, draw the perspective line representing the position of the three courts accurately, and finally connect the chin to complete the model of the head.

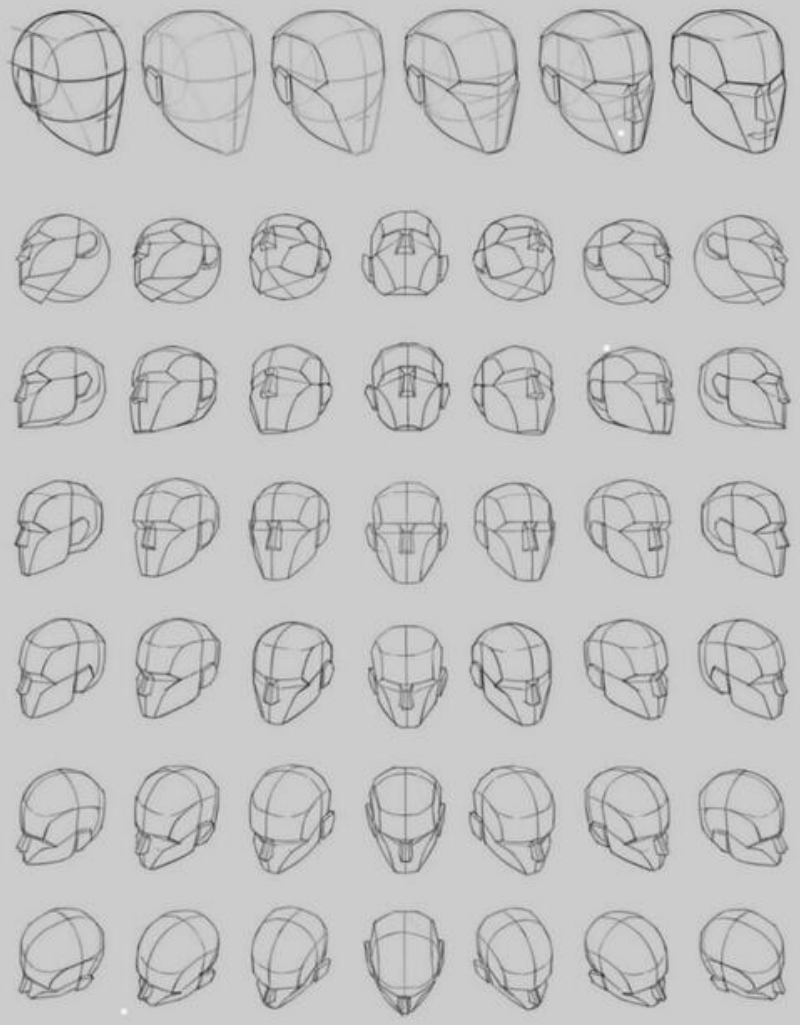


After mastering the above drawing methods, you can use blocks of different angles to draw heads of different angles.



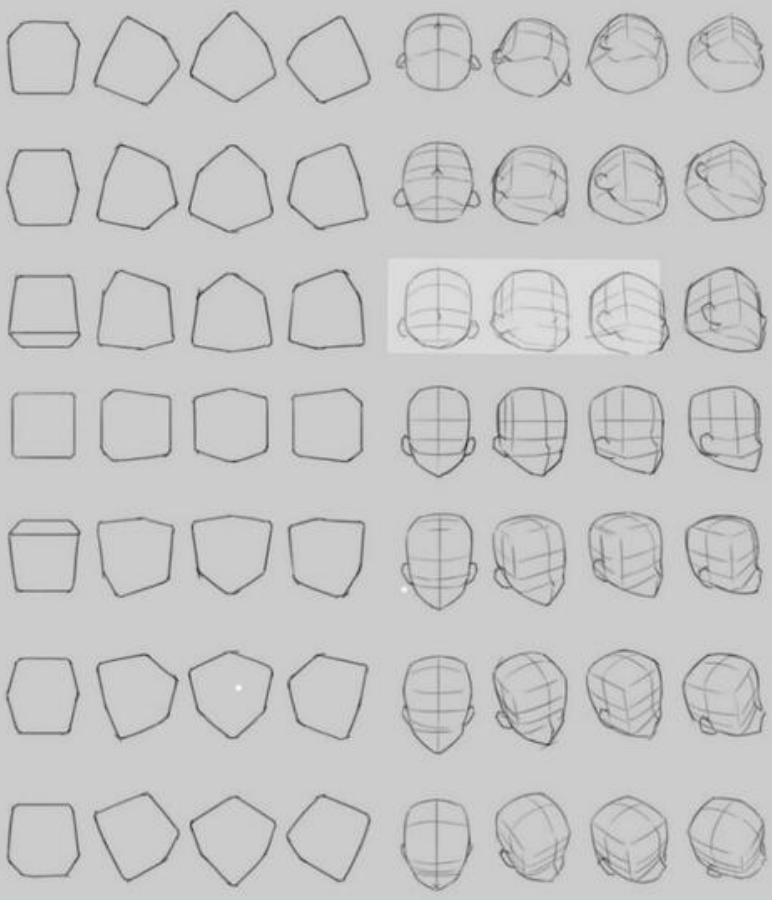
On the basic model of the head, continue to subdivide the face block to get a more specific head movement

The state of the head can be more deeply understood by the dynamic changes of the head.



In addition to some more conventional heads, when drawing some two-dimensional style character heads also

Adjustments can be made on the base head model, such as shortening the chin or enlarging the eyes.



|Tips

For the above head model template, the author uses the form of a square to assist the shape, avoiding the situation that the perspective line facing the face cannot be found by directly using the round shape.

Further refine the basic model of the head, depict the facial features, and get more detailed and different angles

Same head shape.

In the specific painting performance, different head models can be applied in combination with different painting styles. by

The three head models below can basically meet the head performance of most of the characters in the current style.

When applying the model, you can make some changes as needed, such as eyes, down

Personalized shaping of important parts such as bar and nose.

After determining your favorite modeling style, you can practice drawing character heads from different angles

department.

The same method can be used when drawing the heads of beasts.

More special training

Do a set of design idea derivation exercises, which demonstrate the flow of trolls from design to completion diagram

About.

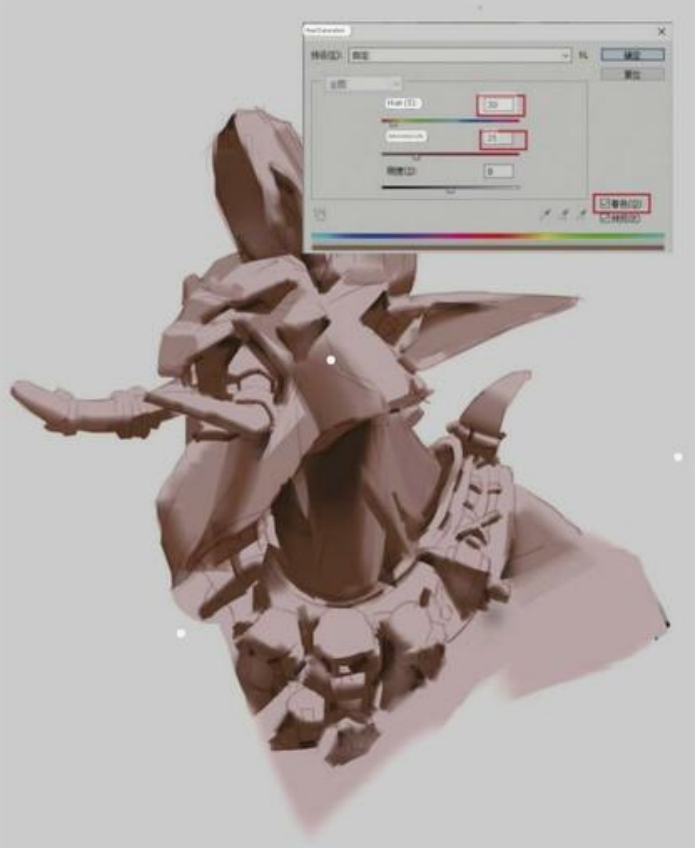
01 Set the character's head skeleton (troll skull warthog and human skull combined to make).

02 Draw the troll's head shape according to the skeleton.

03 Set the light source. Set the light source at the upper right, according to the light source, use black and white dichroic to lay out light and shadow tones for the character in general. Note that it should be divided into two layers to draw, one is the bottom layer and the other is the light and shadow layer.

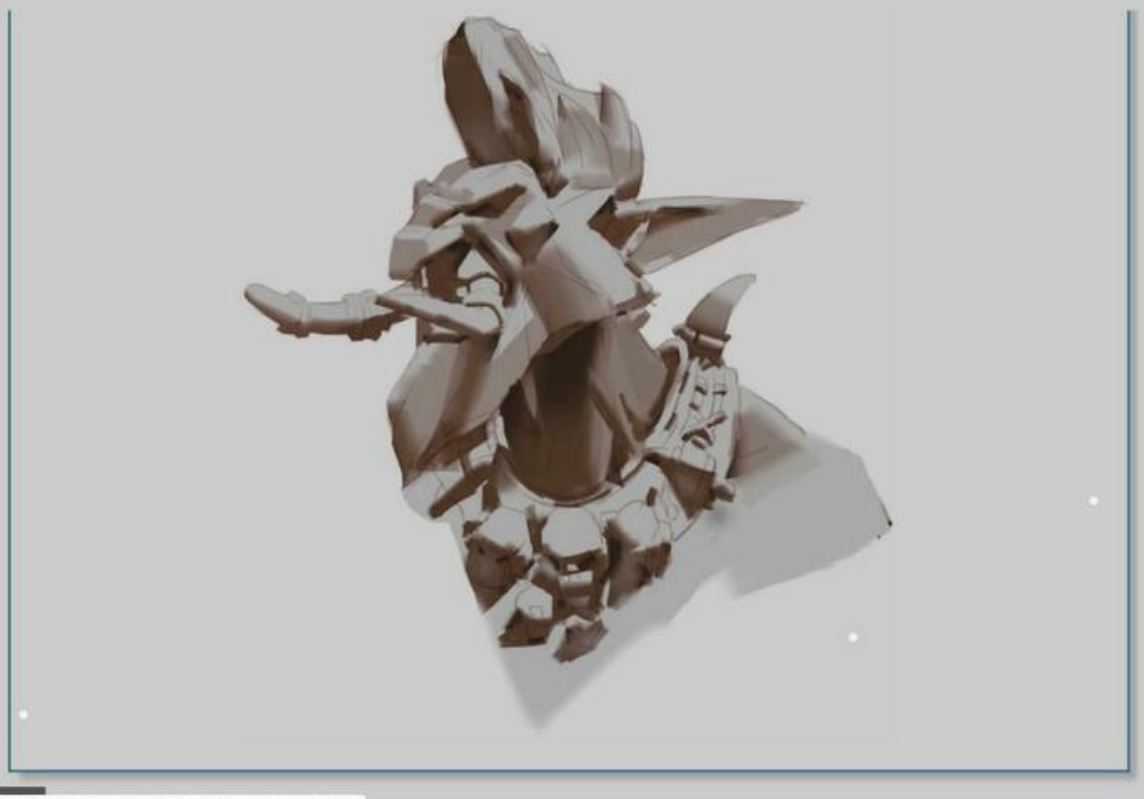
04 According to the structure, the light and shadow structure of the character is refined on the basis of the light and shadow tones, so that it forms three levels of tones of black, white and gray (the changes of light and shadow tones will be specifically explained in the last chapter of this book).

05 Select the coloring layer, open the "Hue/Saturation" property panel, check the "Coloring" option, and adjust the hue and saturation of the coloring layer (here, adjust the hue to a warmer color, but the saturation should not be too high) , make the picture produce the contrast effect of cool and warm on the hue.



hint

Here you can also adjust the lightness and hue of the bottom layer.



06 Fill the character with a background color.

07 Create a new coloring layer (coloring layer), fill in the color according to the shape of the character, and the color can be changed arbitrarily. Then open the light and shadow layer and check the effect of the picture.

03 After determining the color, add a bluish sky light layer on top of the coloring layer, and further enrich the color of the picture in this layer, and the final refinement is completed.

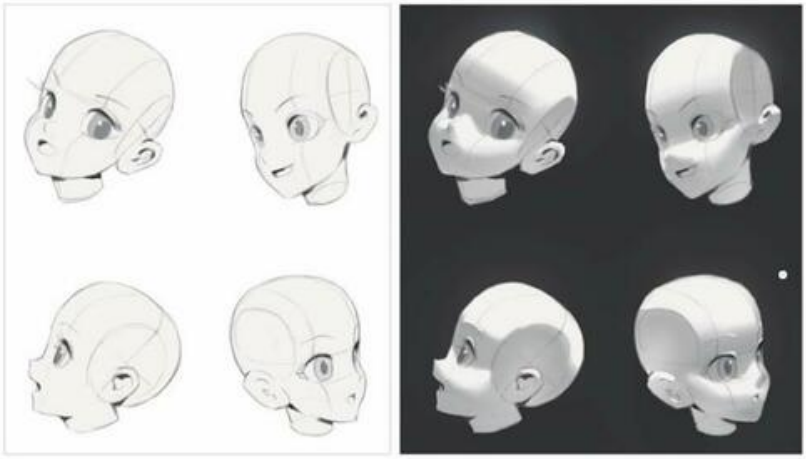
Do a set of head twist dynamic exercises.

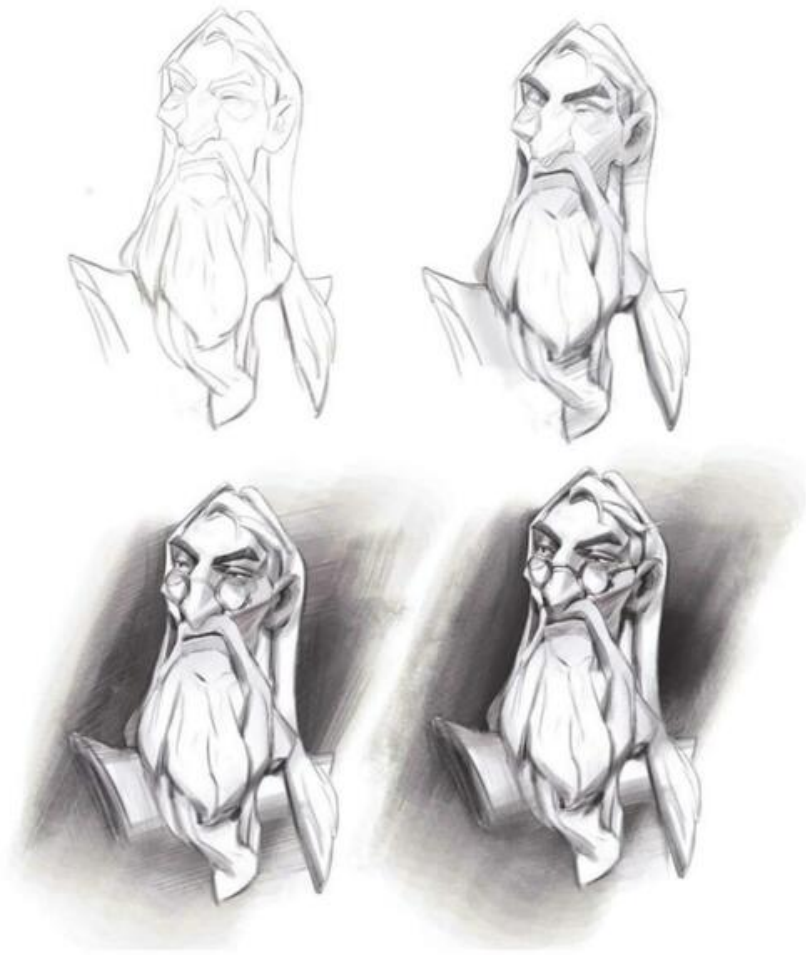
Do a set of black and white avatar exercises.

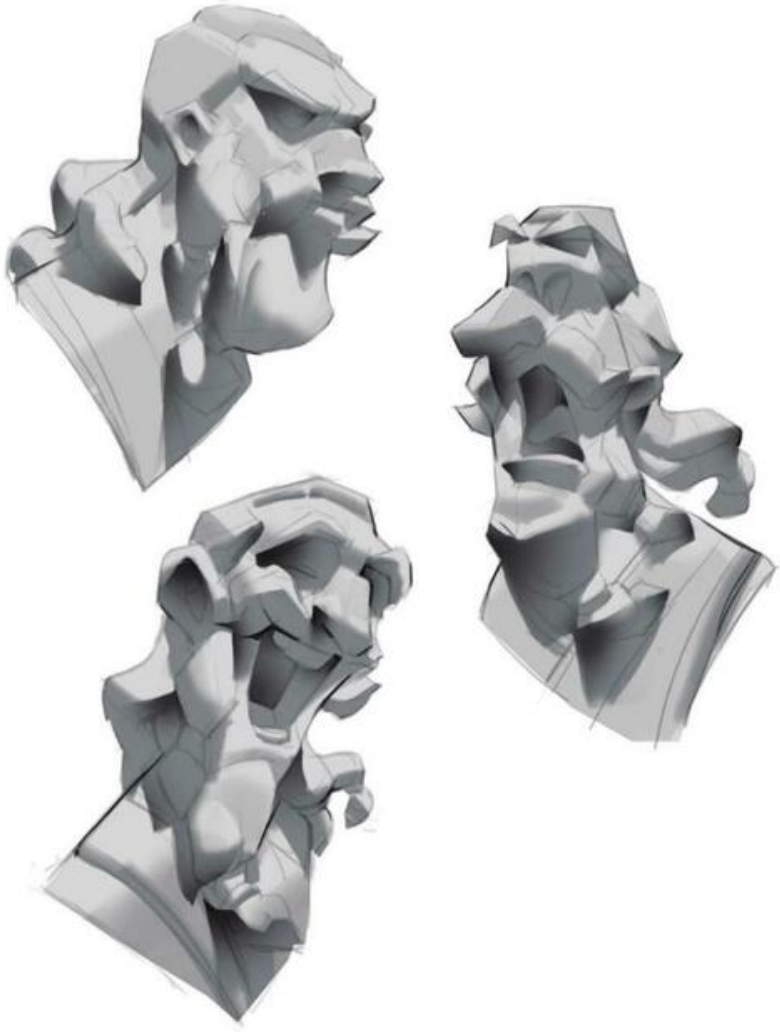
This exercise can cultivate the learner's ability to control the relationship between sketches. During the exercise, you can find inspiration from the photos, and change the appearance of the characters in the photos to make them more in line with the aesthetic needs of the game, animation and other industries.

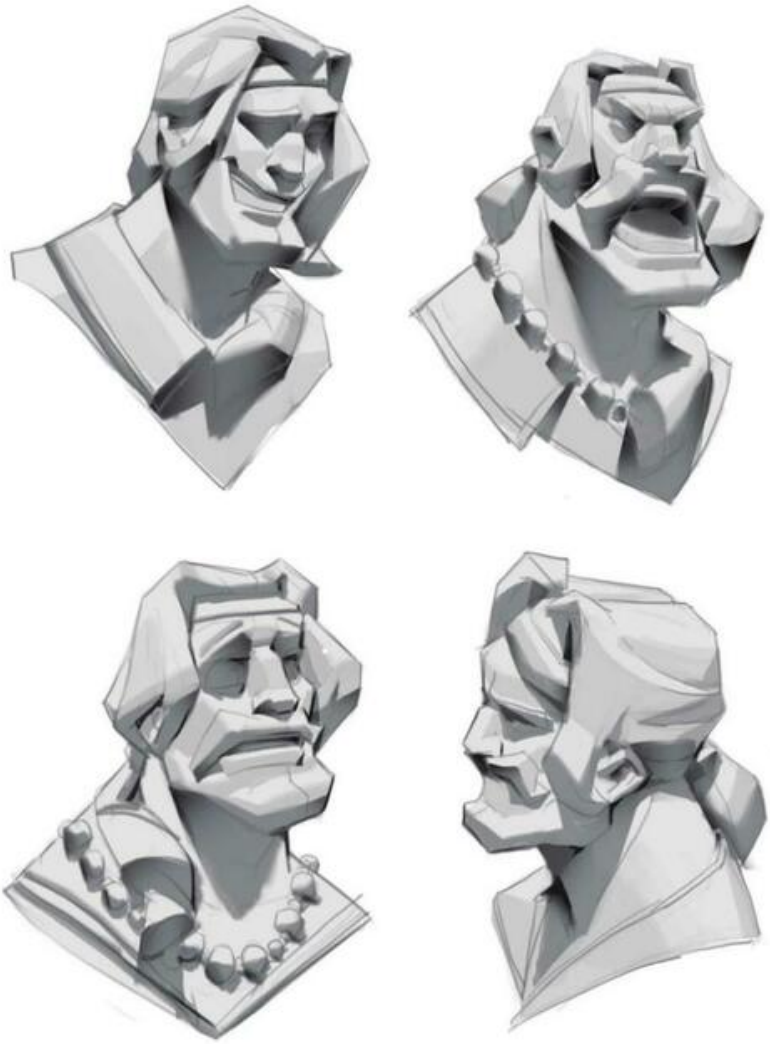
Slightly change the appearance of the people in the photo, such as facial features, head rotation, etc.

Do A set of head lighting exercises.









Do a set of expression exercises.

Do a set of photo-copying exercises.

Chapter 2 Torso Special Training

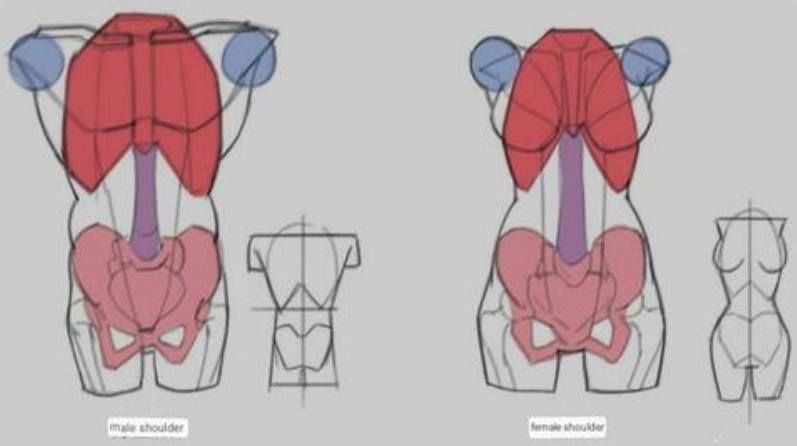
在In the process of learning to draw the human body, the twisting of the torso often affects the beauty of the entire 度，而舒适合理的躯干扭动会让人体动态更加自然。本章会详细 human body. Explain the proportional structure of the torso, the spatial cognition of the rib cage and pelvis, and the bones and muscles of the torso. At the same time, this chapter also analyzes the state of various torso twisting, and deeply explains the changes of bones and muscles formed by the trunk under different twisting situations.

2.1 Torso proportional structure

For learning the human body, it is very important to master the proportional structure of the torso, and the human body drawn without understanding the structure of the torso is often inaccurate.

2.1.1 The proportions of the torso

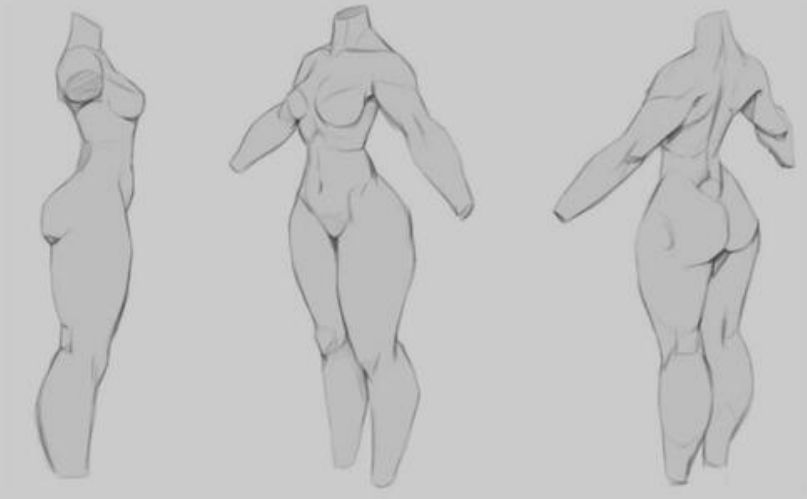
There are three main differences in the ratio of the torso between men and women: The first is that the ribcage of men is wider than that of women. The second point is that women's pelvises are wider than men's. These two points result in an inverted triangle shape for men and an equilateral triangle shape for women. The third point is that the joints of men are slightly larger than those of women, and the distribution is slightly wider, which leads to the fact that men's shoulders are wider than women's shoulders.



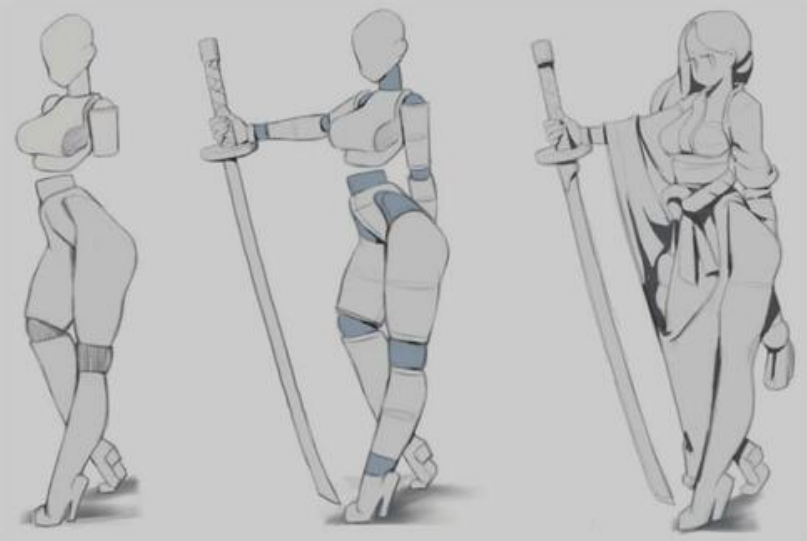
2.1.2 Structure of the torso

The structure of the torso can be simplified into a simple geometric body to understand first, and pay attention to the connection relationship of each body block.

The torso structures at different angles are as follows.



The female torso structure relationship is shown below.



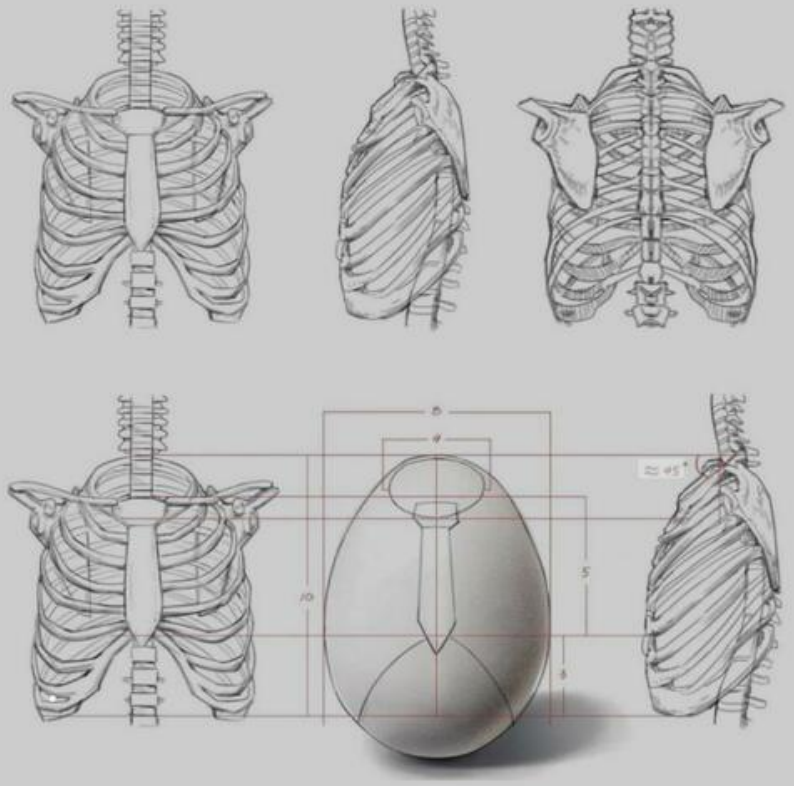
The structural relationship of the male torso is shown below.

2.2 Cognition and drawing skills of thoracic cavity

As an important part of the human torso, the thoracic cavity plays a linking role, so its proportional structure and the accuracy of perspective are particularly important. This section will analyze the basic proportions of the thoracic cavity, but the proportions of the human body in actual painting are different for different genders and different painting styles.

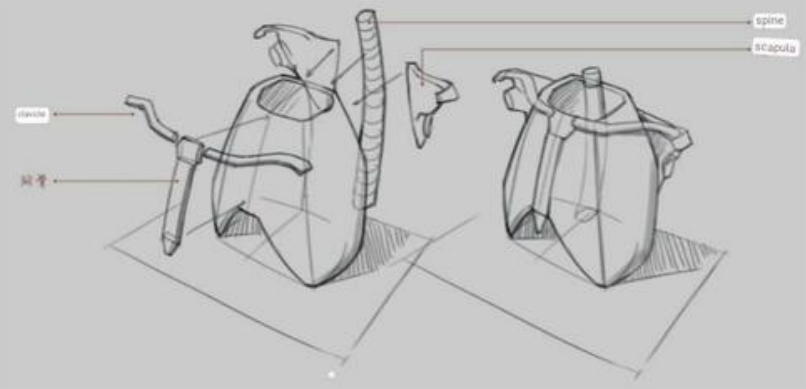
2.2.1 Basic proportions of the ribcage

According to the bones of the thoracic cavity, it can be seen that the front of the thoracic cavity is like an oval egg, and the side is large. About half an oval less than the front. As can be seen from the figure below, if the height of the ribcage is about 10, then the width is about 8, the width of the circle connecting the neck above is about 4, the slope is about 45°, the length of the sternum is about 5, and the "under the ribcage" is about 5. The arch" is about 3 in width.



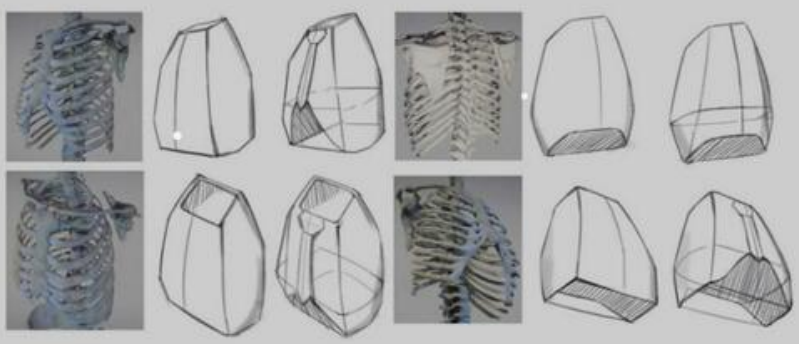
2.2.2 Structure and perspective of the thoracic cavity

The structure of the thoracic cavity is very simple. The front clavicle and sternum of the thorax form the shape of a bicycle handlebar, the two triangular scapulae on the back and the clavicle in front form a ring, wrapping the entire thoracic cavity, and there is a long tubular spine in the middle of the back.



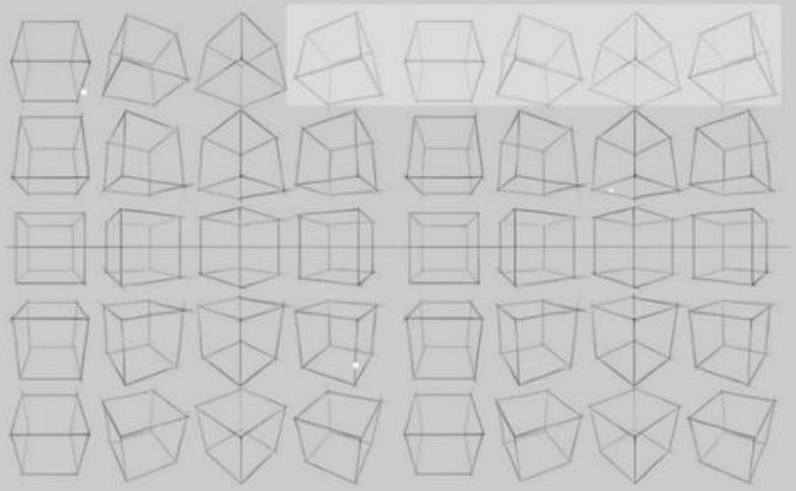
Provided below are two ideas for practicing drawing the structure of the ribcage.

Exercise 1: Summarize the structure of the thoracic cavity based on photos or models.

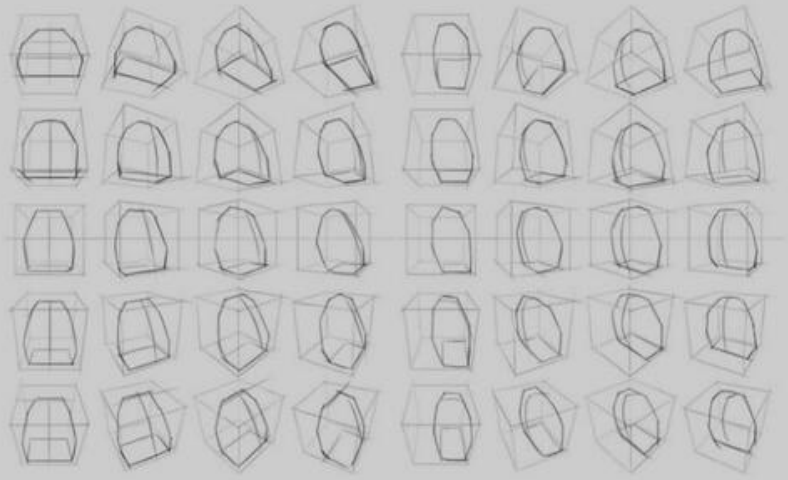


Practice method: Silently draw the thoracic structure from different angles to strengthen spatial cognition. The specific drawing process of the thoracic structure is as follows.

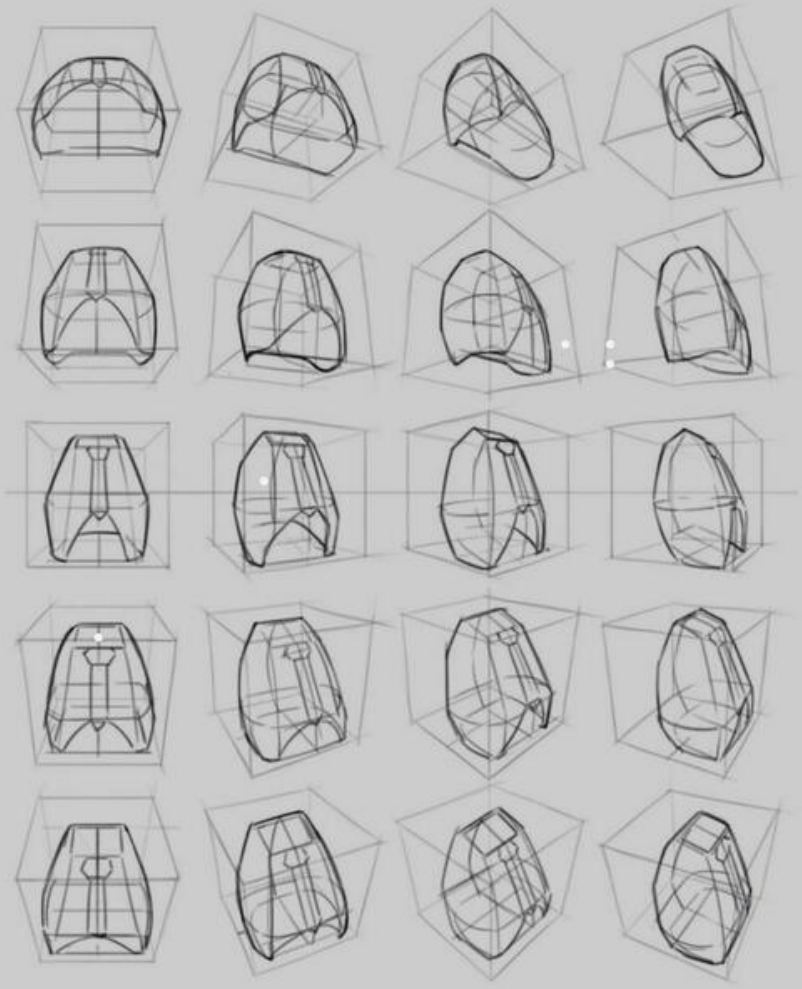
01 First draw cubes with different angles. The establishment of the cube can make it easier for us to find the spatial location of the ribcage. When drawing, attention should be paid to the perspective changes and scale changes of the cube.

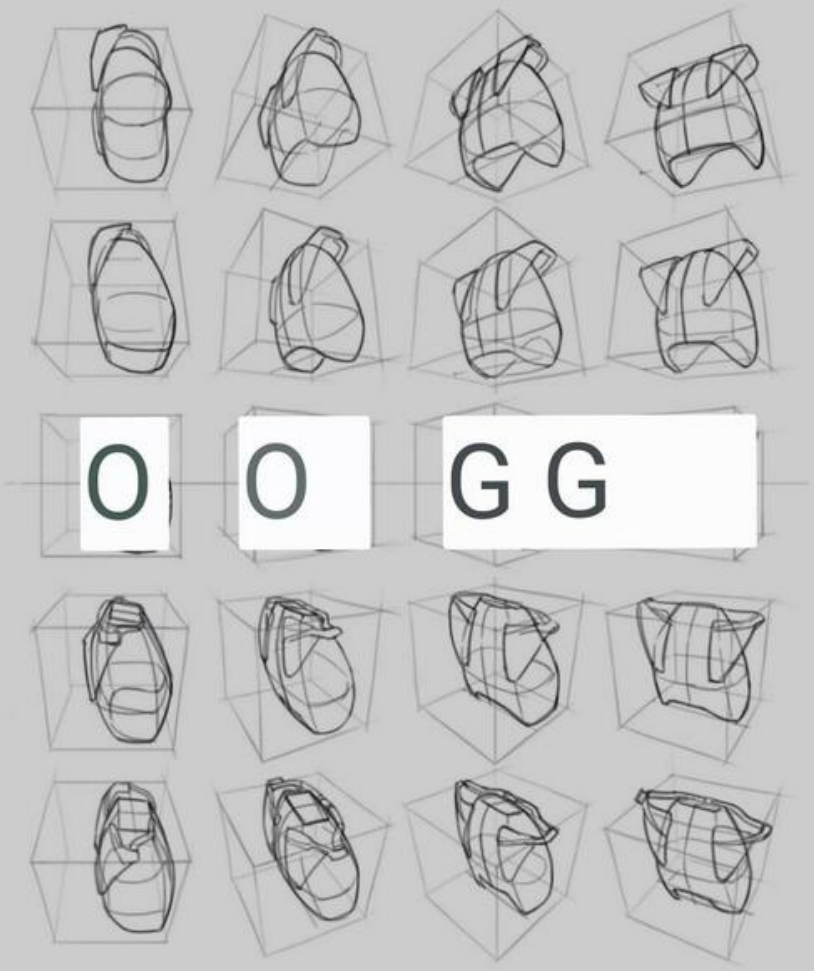


02 Draw a simplified rib cage in a cube. The approximate egg-shaped outline and calculated proportions were used to determine the spatial position of the ribcage in the cube.



03 Refine the internal structure and perspective relationship of the thoracic cavity supplement.



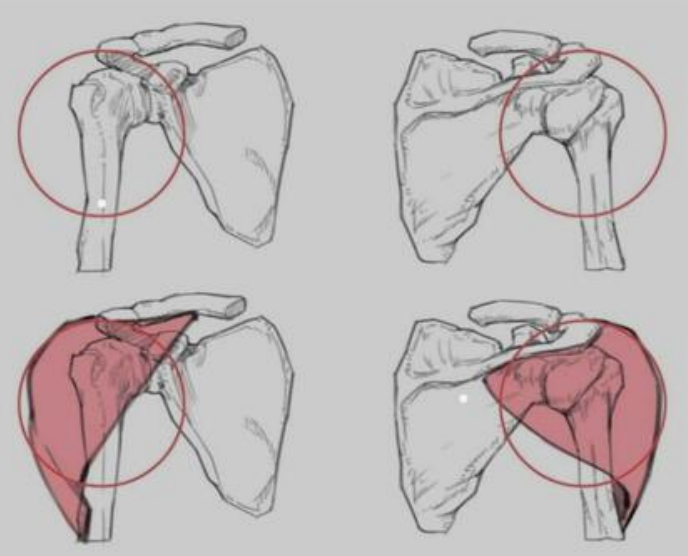


"hint

The above exercises can greatly enhance our control over the sense of space and help us establish a spatial coordinate system in our consciousness.

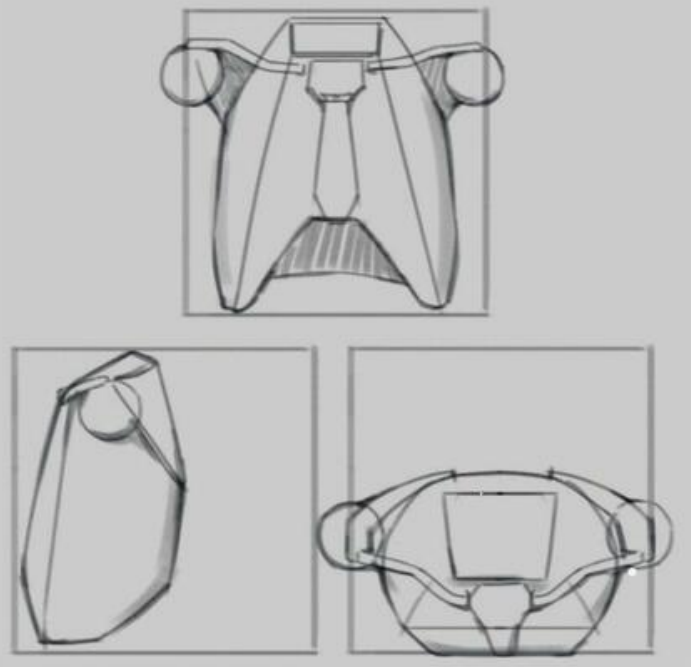
2.2.3 The relationship between arm joint ball and thoracic cavity

The ball of the arm joint connects to the ribcage and is about the size of the deltoid muscle.



When the arm sags naturally, the ball of the joint is located on both sides of the ribcage, at the junction of the clavicle and the scapula.

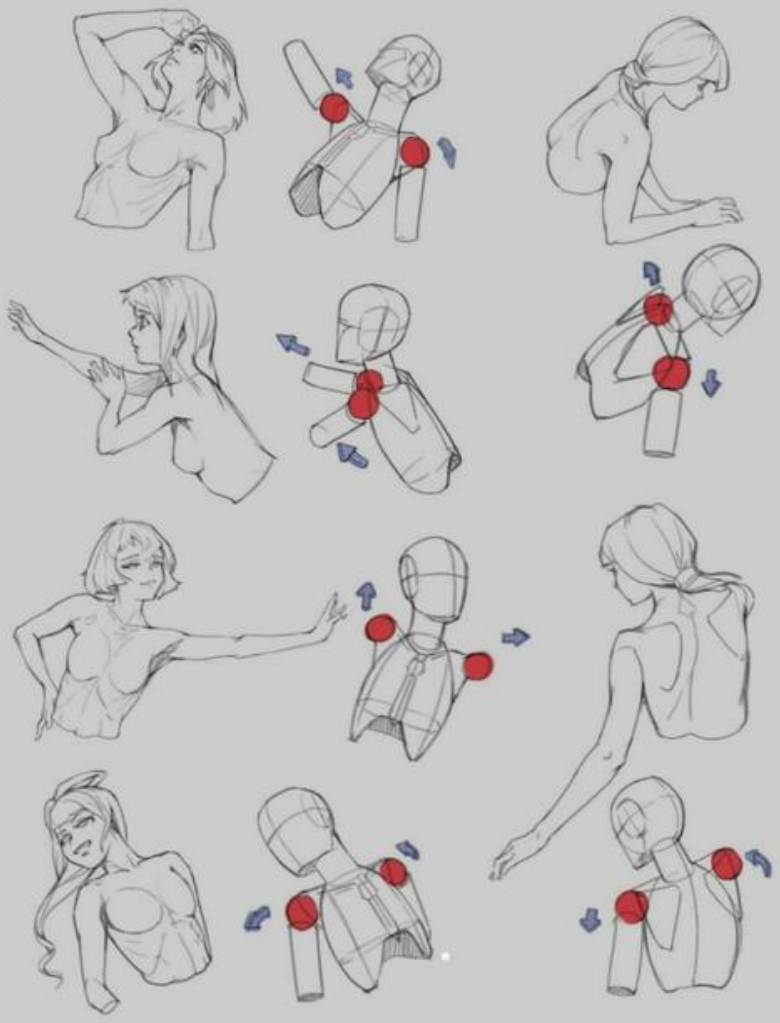
below.



The joint ball is movable and can be moved forward, backward, upward or downward through the action of the clavicle and scapula.

For example, we can clearly feel it when we reach out, shrug, or stretch.

to the joint ball in motion.



The size of the figures drawn is different, and the proportions of the joint balls are also different.

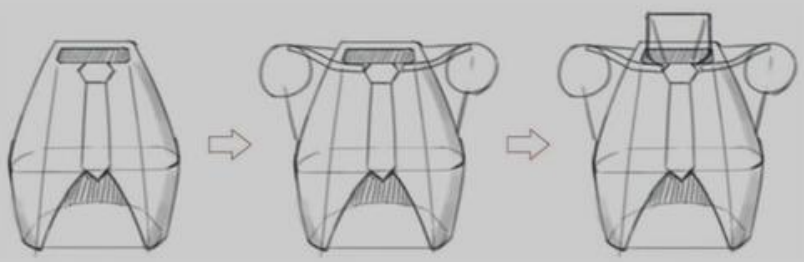
In the creative process, the size of the joint ball is very important, which will affect the ratio of the shoulder width of men and women

2.2.4 Adding muscles to the ribcage

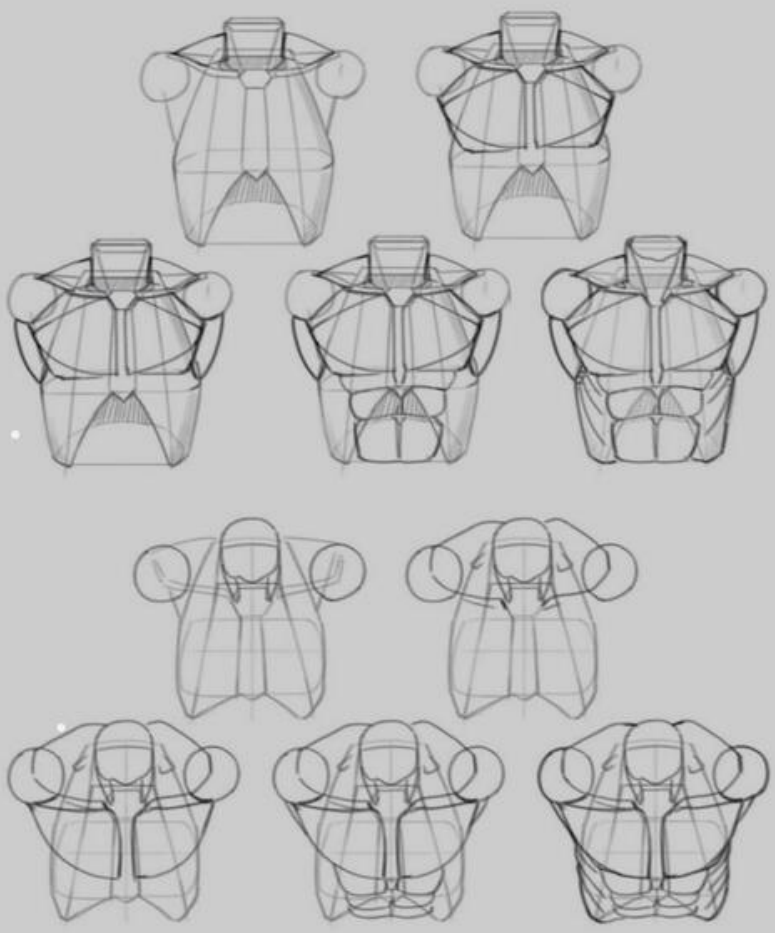
The articular ball structure of the thoracic cavity has

After a certain understanding, you can try to add muscle to the bracket

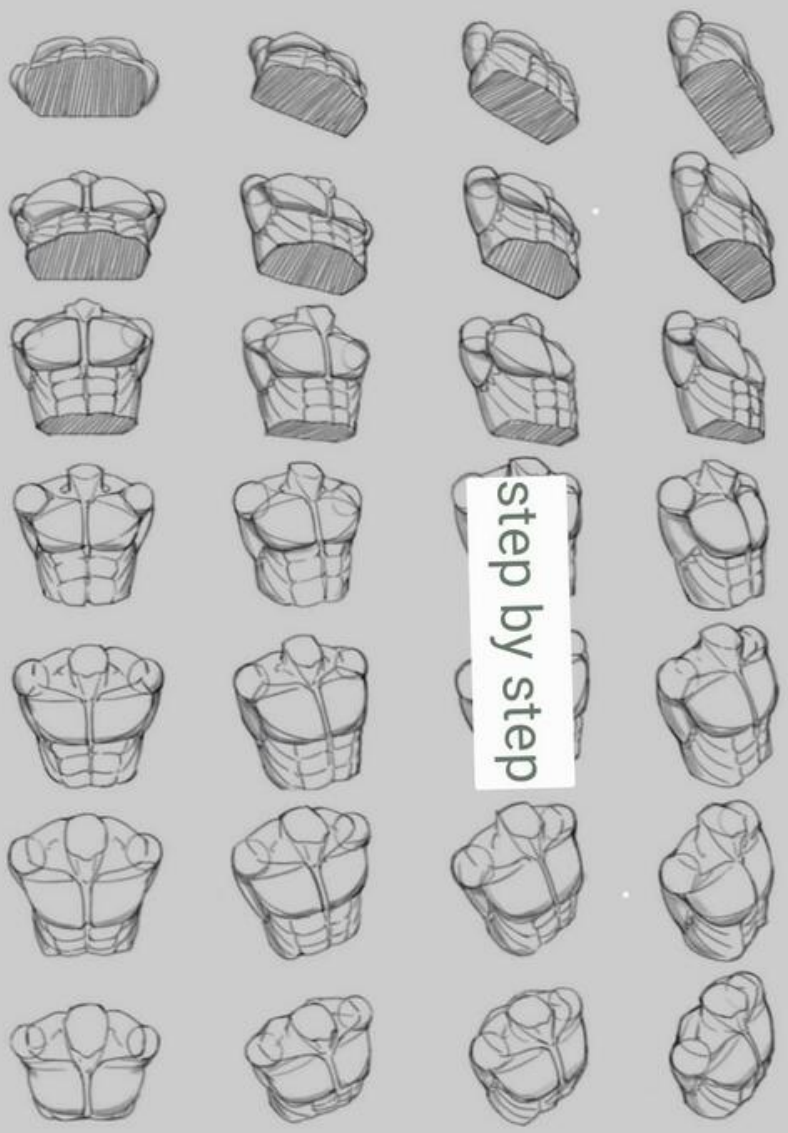
meat.



Build a simplified thoracic stent.

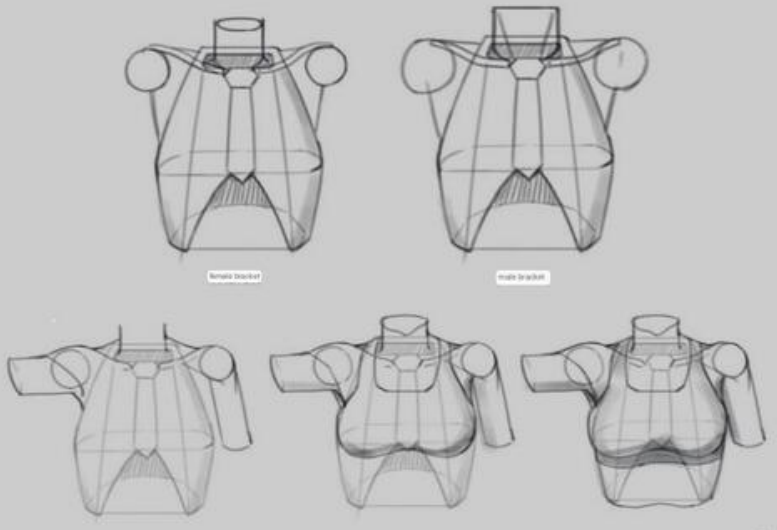


Combined with thoracic brackets of different angles, muscles are added in sequence, so that the drawing training of multi-angle thoracic cavity can be realized.

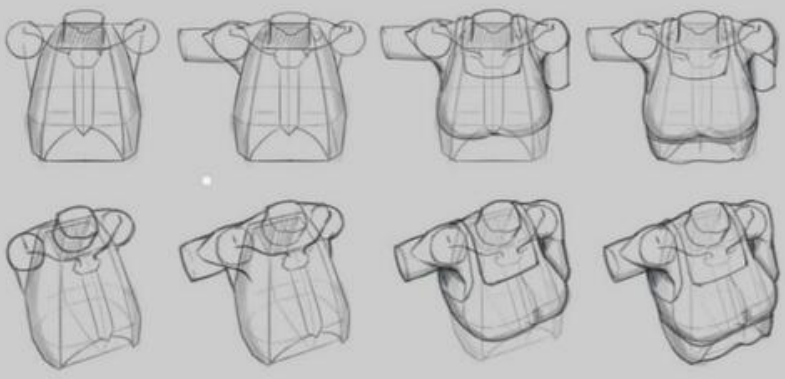


2.2.5 Characteristics of female thoracic cavity

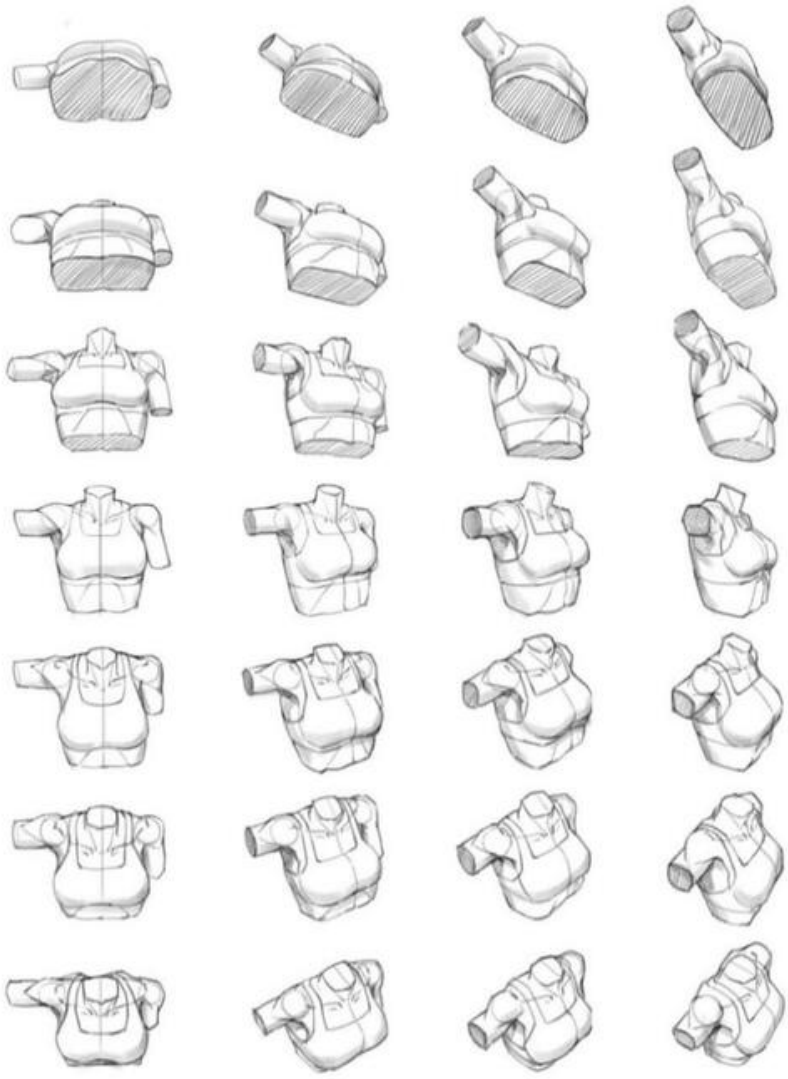
There is no need to draw too much muscle structure when drawing a female ribcage, but you can add a volume representing the breast as needed. Compared to male braces, the joint ball structure on female braces is smaller and the neck is thinner.



When drawing women you need to add deltoid and chest structures to the brackets.



When drawing the thoracic cavity of other angles, as long as the positional relationship of the body blocks is drawn correctly, the characteristics of the female thoracic cavity can be accurately represented.



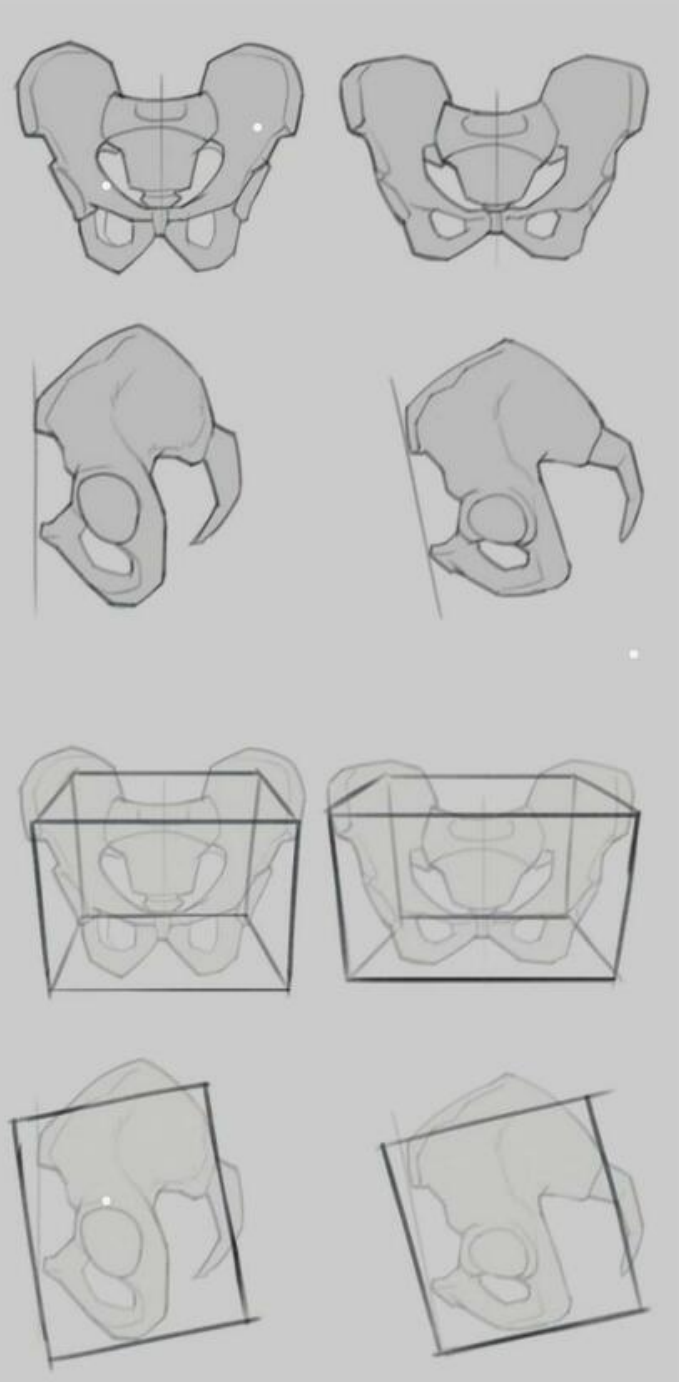
2.3 Proportion and spatial perception of the pelvis

The pelvis is a relatively complex human body structure, and the difference between male and female pelvis is also relatively large. Therefore, in addition to understanding the ratio of male and female pelvis, it is necessary to simplify the structure of the pelvis to facilitate understanding and memory.

2.3.1 Proportion of the pelvis

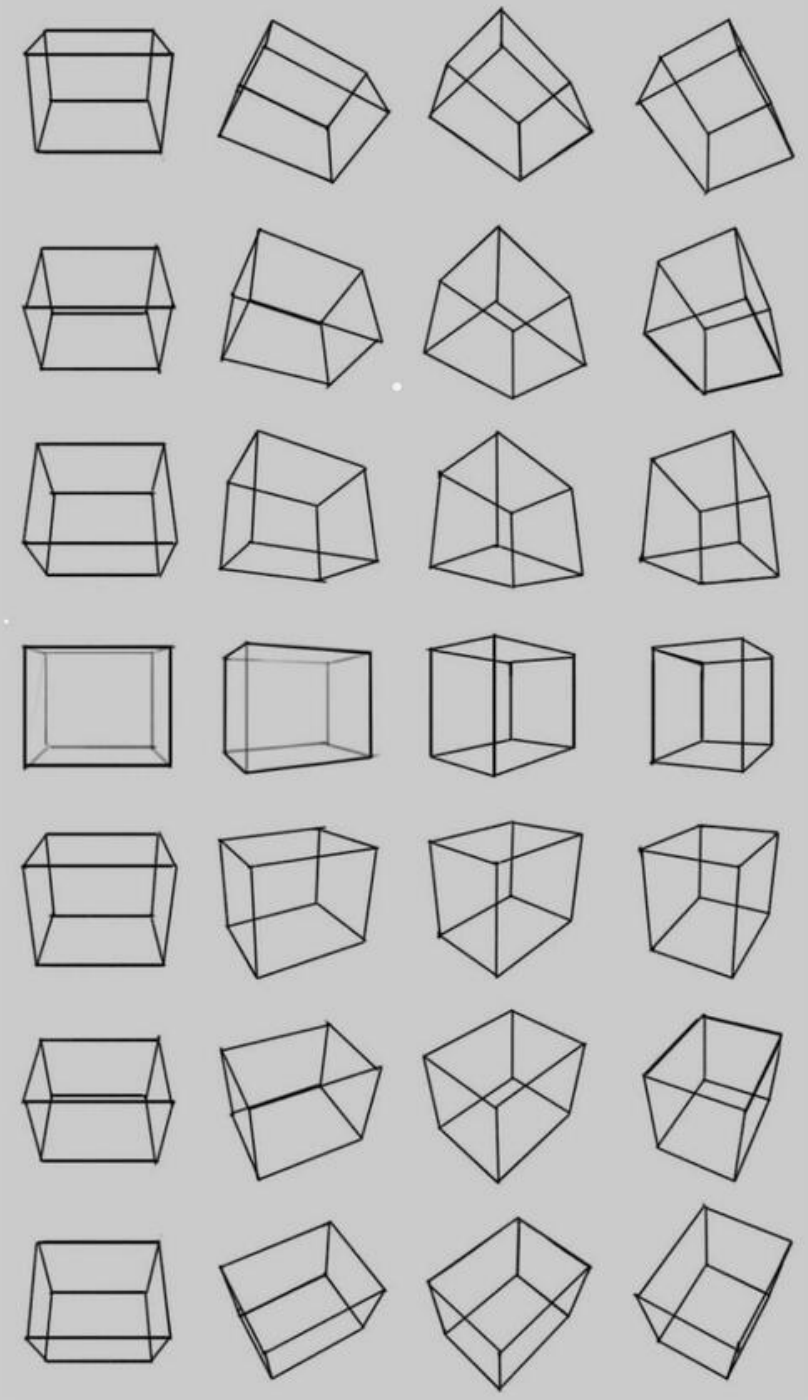
Observe the picture below to understand the difference in the proportions of male and female pelvis. The aspect ratio of male pelvis is closer when viewed from the front, while there is almost no inclination when viewed from the side. In contrast, women's pelvises are wider and more inclined laterally when viewed from the front.

According to the above, we can get the general length, width and height of the male and female pelvis. For the convenience of analysis, put the male and female pelvis into a square and take the average value of the difference between males and females to obtain a cuboid with a thickness of 0.75, a height of 0.75, and a width of 1.



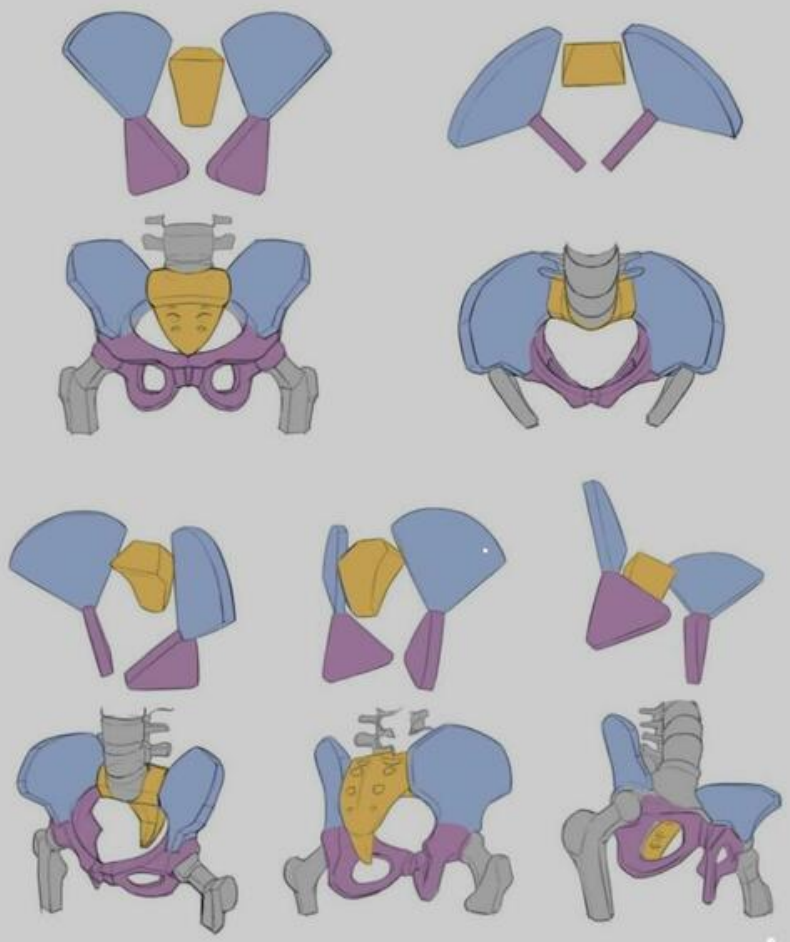
In the actual painting process, the difference between male and female pelvis can be expressed by adjusting the length, width and height of the cuboid.

The picture below shows the cuboid blocks representing the pelvis from different angles.

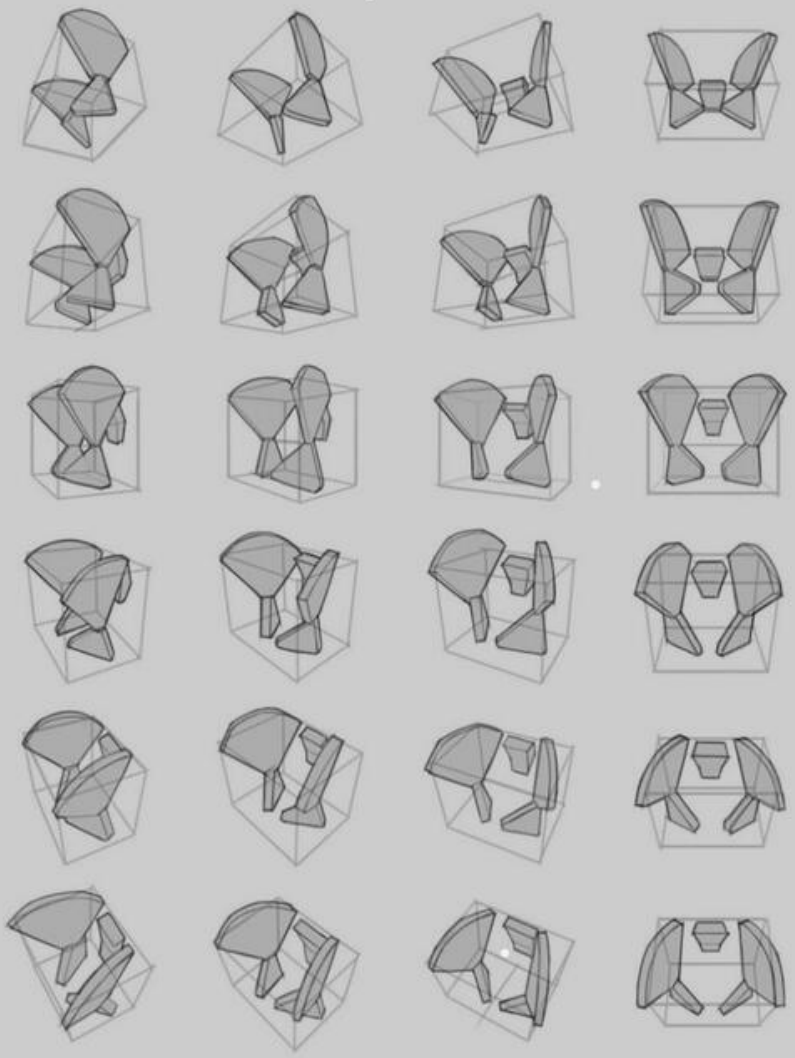


2.3.2 Structural simplification and spatial cognition of the pelvis

It simplifies the complex pelvic structure, which is convenient to find the perspective changes of the pelvis in the spatial



Put the simplified pelvis into the cuboid calculated before, so that the simplified pelvis of various angles can be obtained. When drawing the human body, the bone points and orientation of the pelvis can be determined through the cuboid, and attention should be paid to the perspective and scale changes of the cuboid.



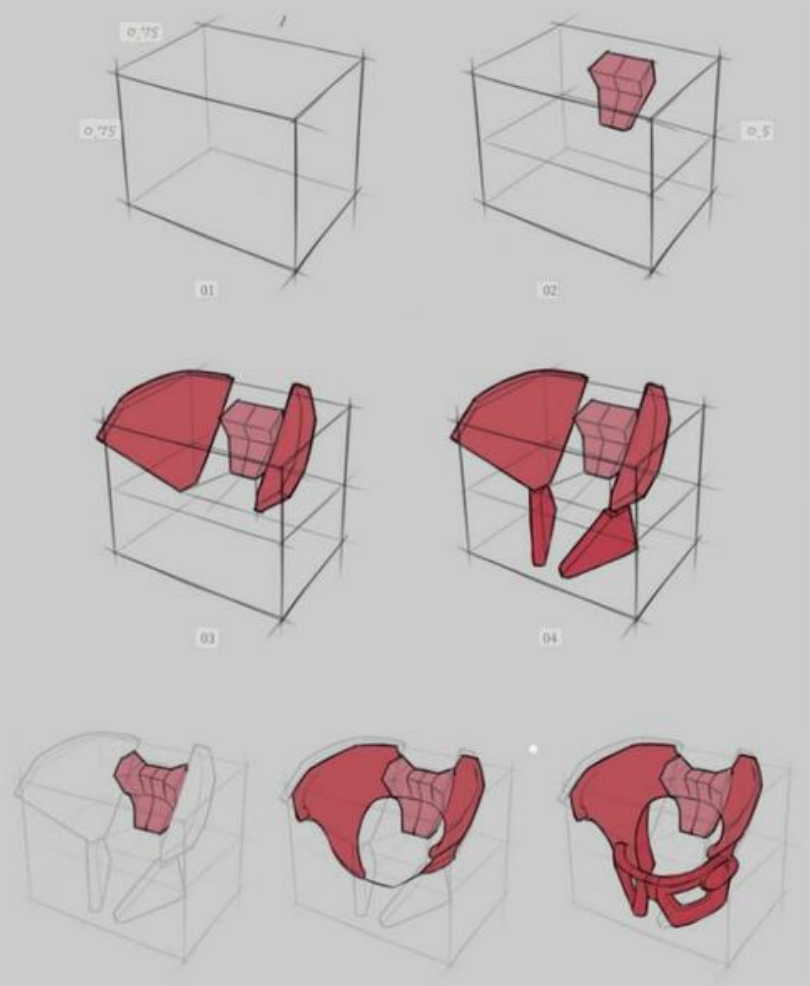
According to the simplified cuboid, the real pelvic structure can be restored, and the specific process is as follows.

01 Draw a well-proportioned cuboid.

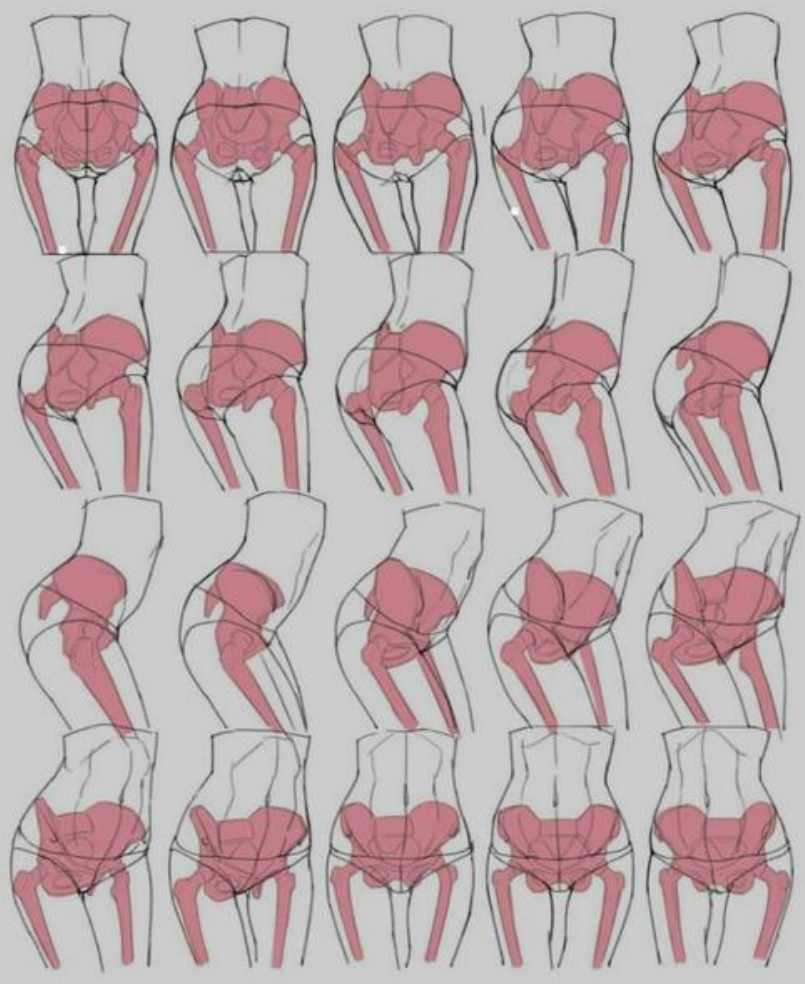
02 Determine the position of the coccyx in the cuboid.

03 Determine the spatial relationship of the sector (iliac bone).

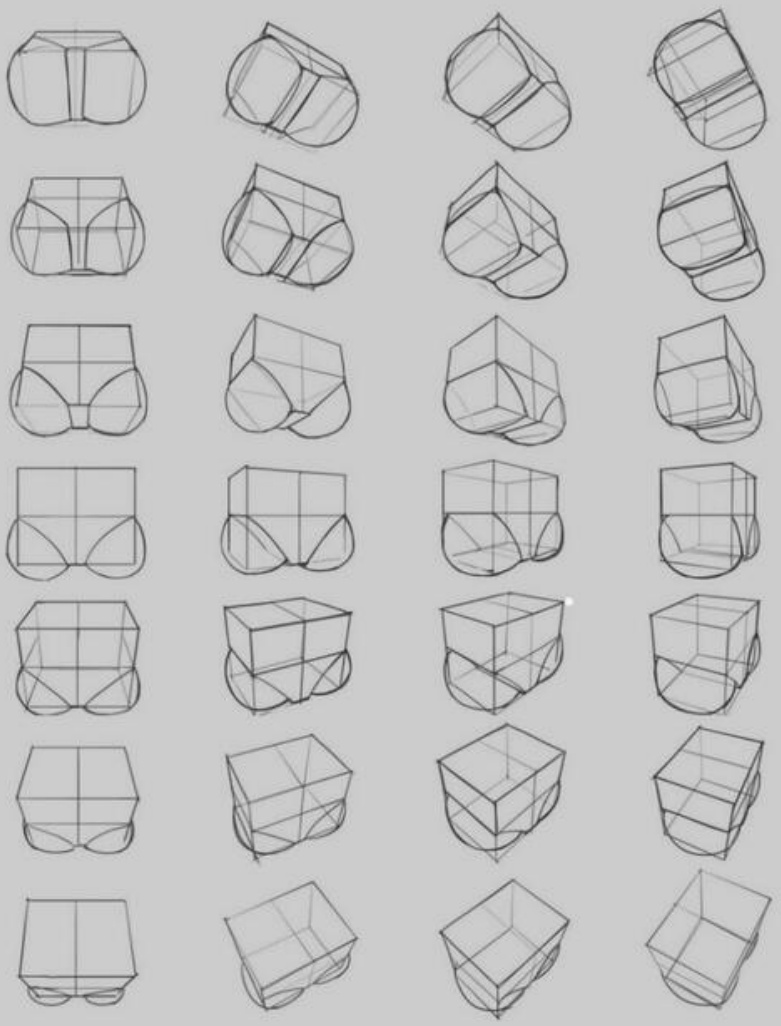
04 Draw an ellipse at the bottom to position the two small triangles.



Add muscles to the pelvis at different angles, using knowledge of anatomy to perform hip twist.



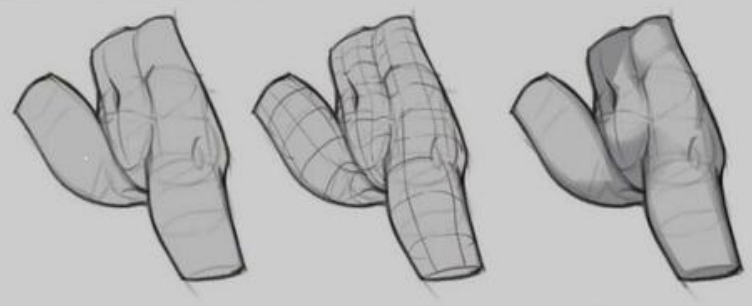
After mastering the above methods, you can directly use the cuboid to determine the orientation of the pelvis in actual painting. As shown in the figure below, here we directly summarize the pelvis in the form of a cuboid and a joint ball.

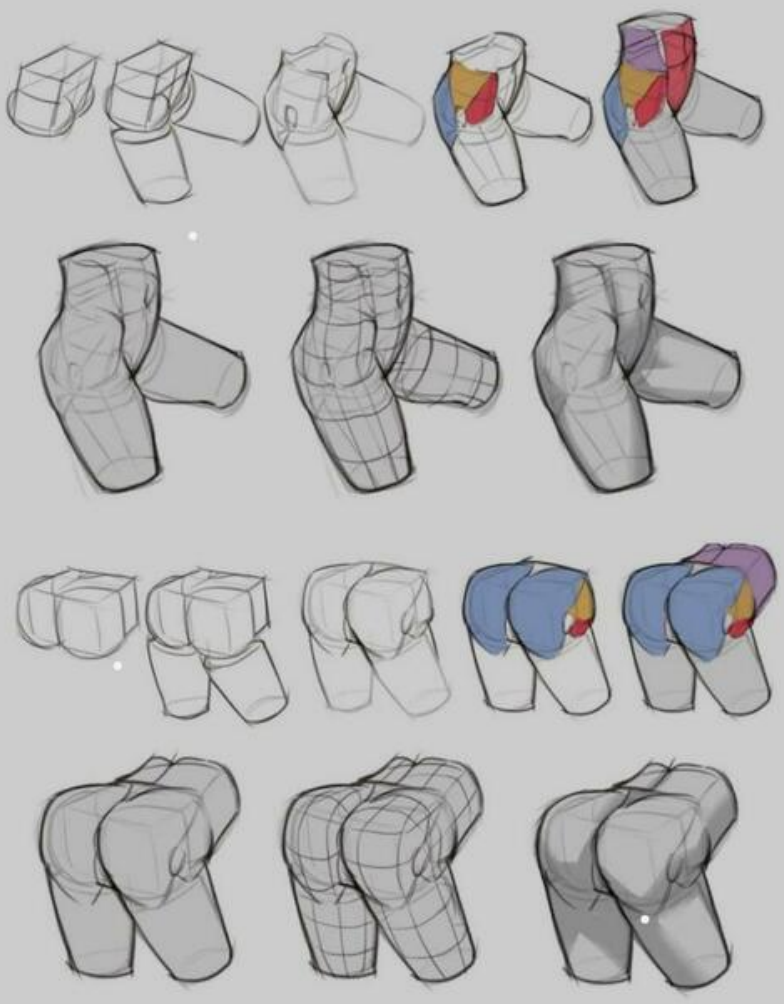


With the aid of the cuboid, and adding the muscle structure, you can get the desired human body structure

Schematic too.

MOM





|Tips

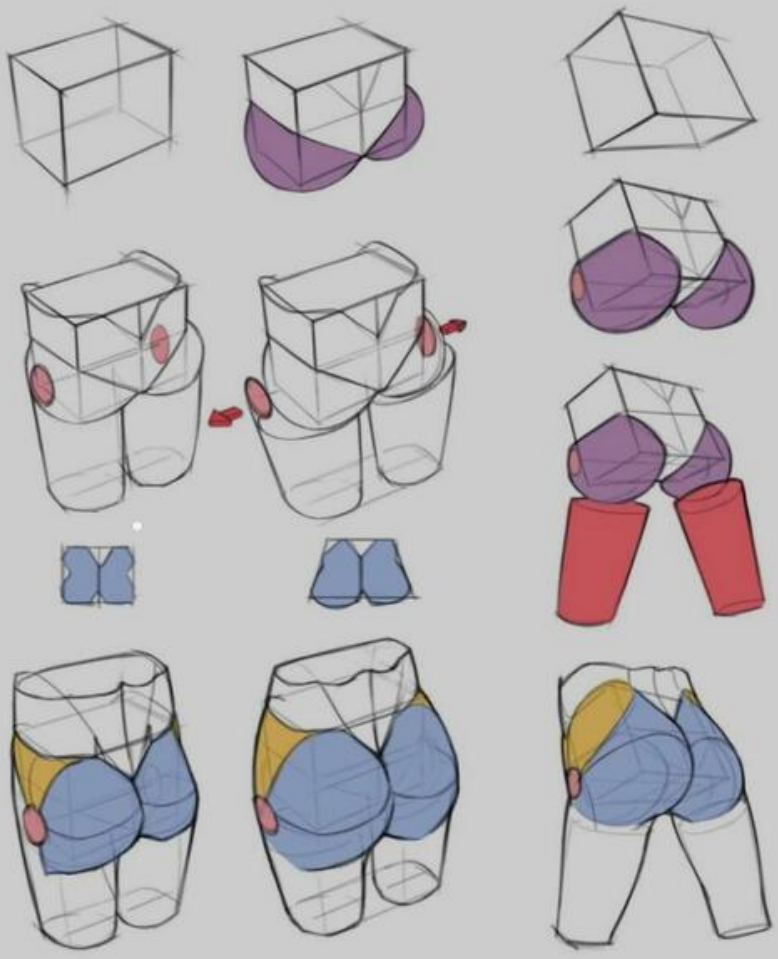
In the above drawing process, the most important thing is to first establish a cuboid representing the pelvis, and then use the spatial perspective coordinates of the cuboid to draw the muscles of the corresponding part.

2.3.3 Influence of pelvis on buttock drawing

There is a big difference in the shape of the buttocks of men and women, mainly due to the difference in the ratio of the length, width and height of the pelvis.

completed.

When reflected on the cuboid representing the pelvis, the cuboid representing the female pelvis is wider, so the greater trochanter of the female femur is slightly wider than that of the male.



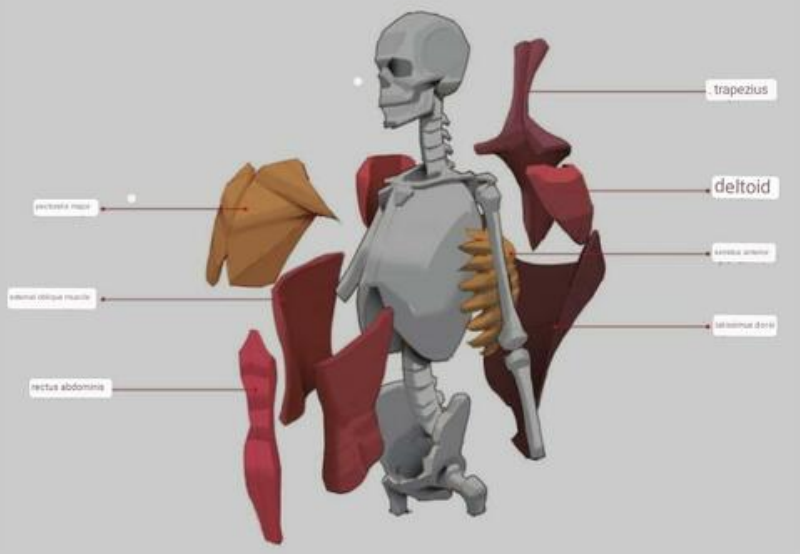
When drawing the female buttocks, pay attention to the changes in the position of the greater trochanter of the femur. Try to draw as round and full as possible.

After mastering the above buttock drawing methods, you can do some special buttock drawing exercises, and you can add clothes and trousers according to the structure of the buttocks.

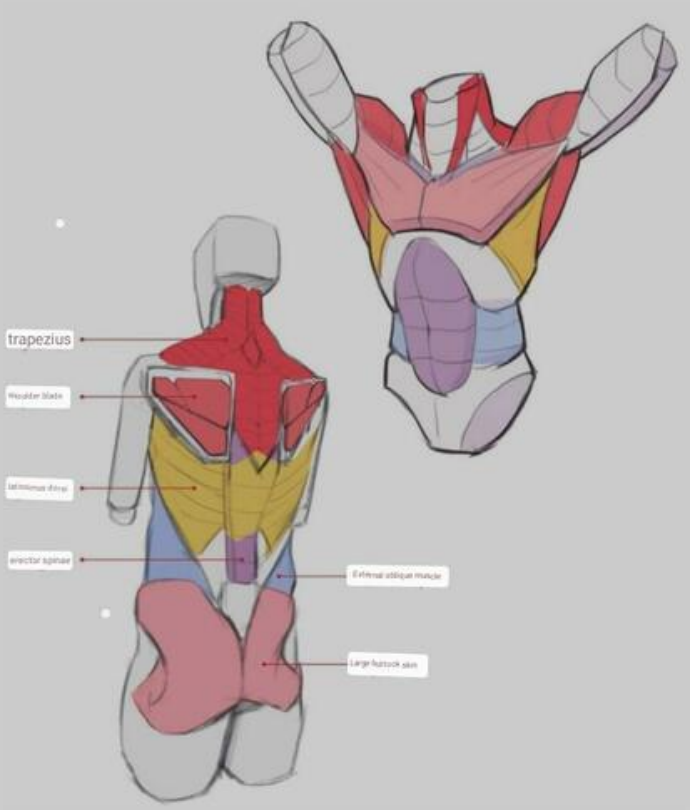
2.4 Influence of trunk bones and muscles on body surface performance

Before going into detail about the impact of trunk bones and muscles on body surface performance, let's get a general overview

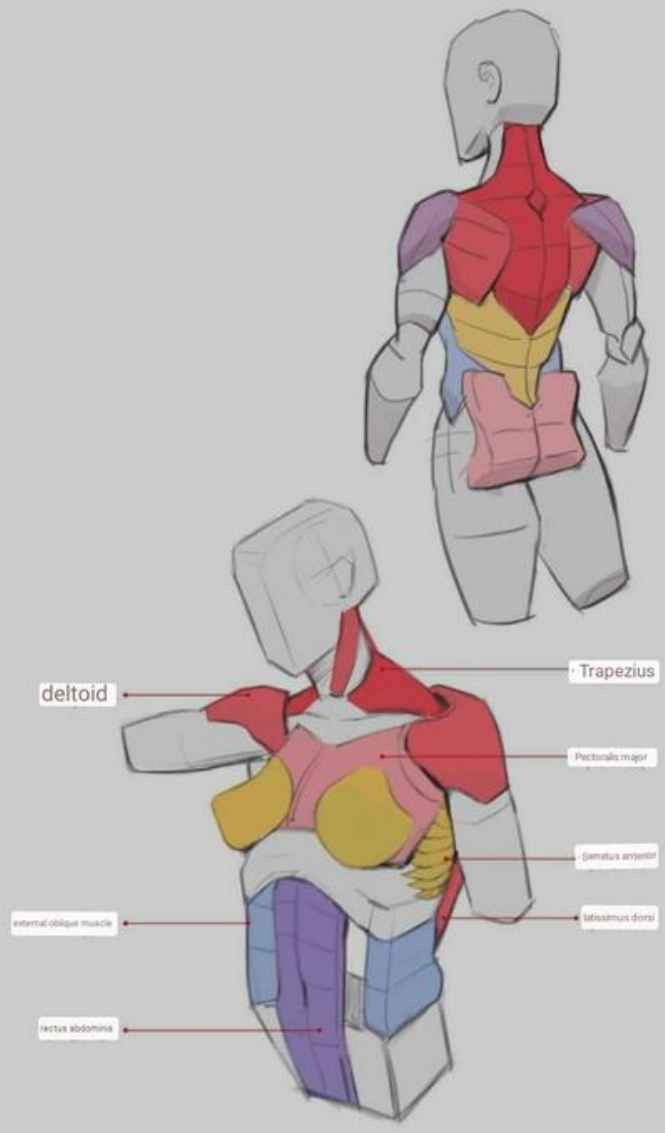
Find out the names and shapes of the bones and muscles of the torso.



trunk muscle anatomy

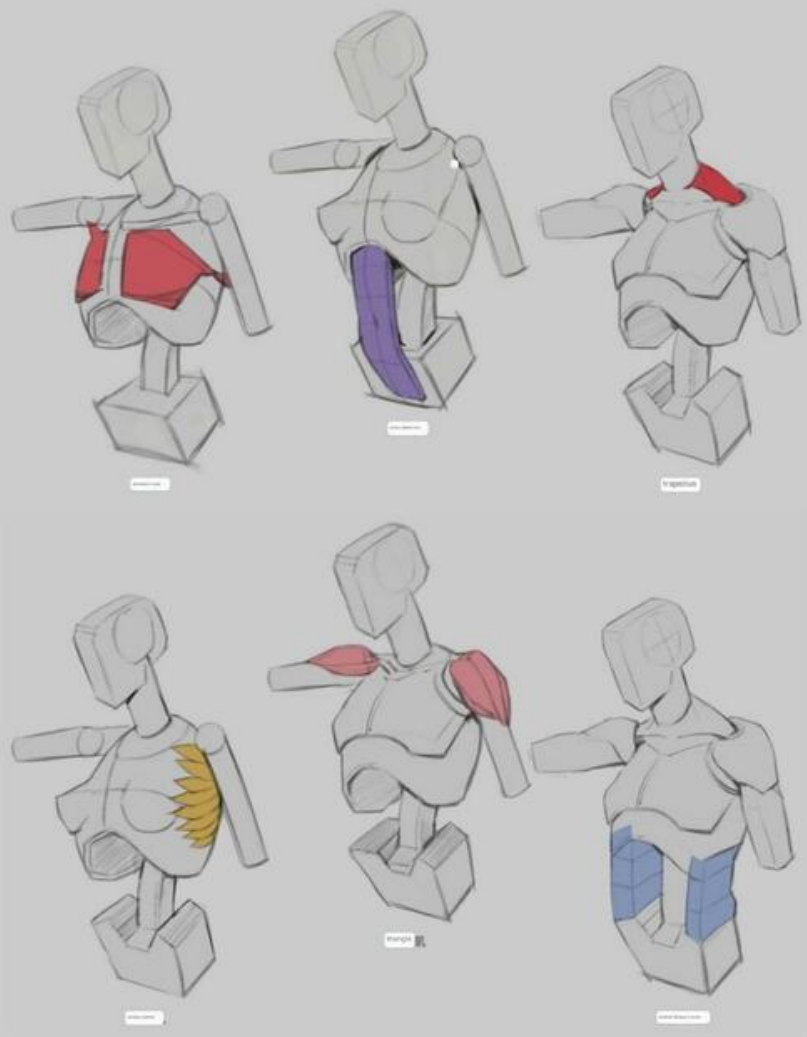

trapezius
Shoulder blade
Latissimus dorsi
erector spinae
External oblique muscle
Large buttock skin

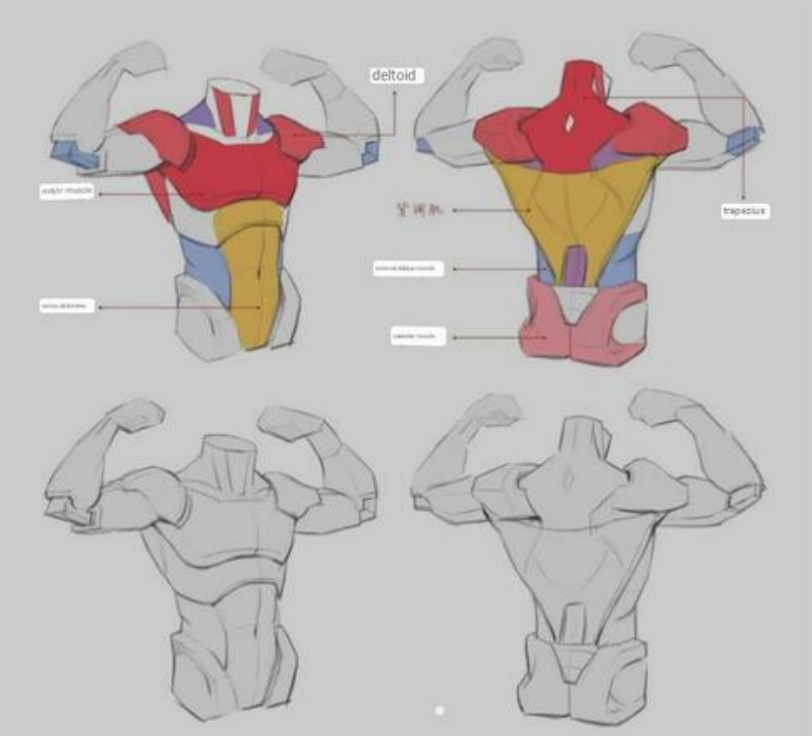
male


deltoid
Trapezius
Pectoralis major
Serratus anterior
external oblique muscle
latissimus dorsi
rectus abdominis

Woman

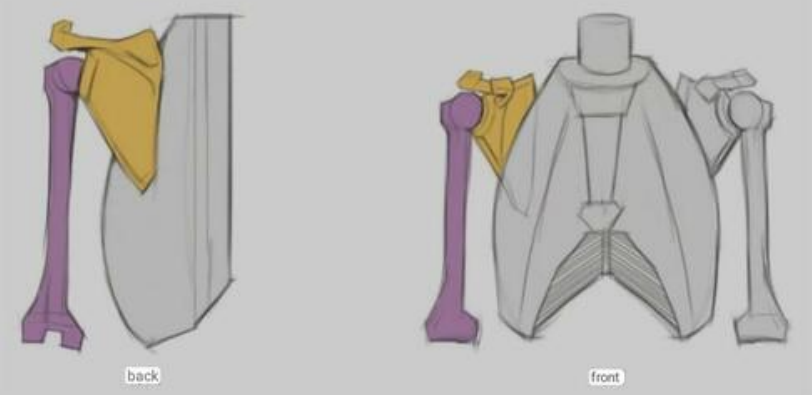
trapezius

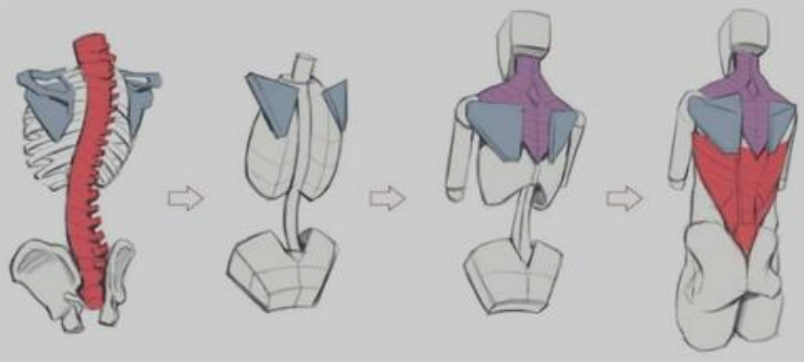

trapezius
triangle



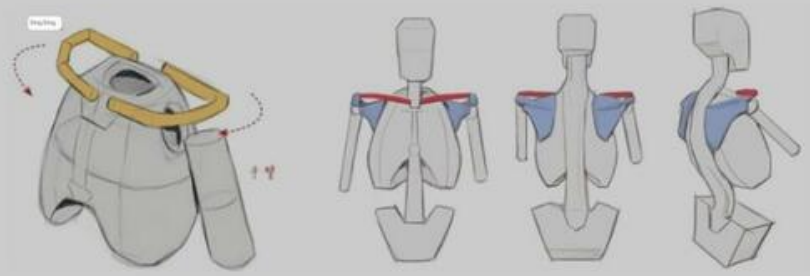
2.4.1 Influence of scapula and muscle groups on body surface performance

Think of the scapula, clavicle, and arm as a whole, and both move accordingly when the arm moves.

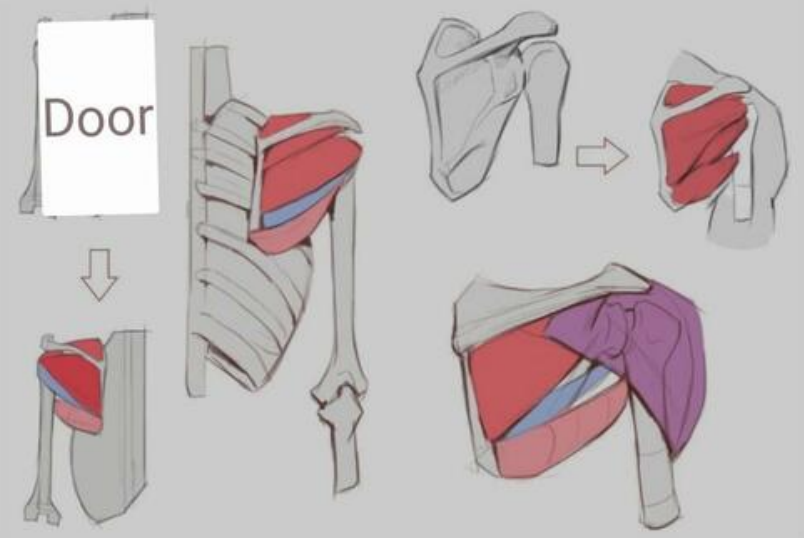




The scapula and clavicle are connected and encircle the ribcage, appearing to clamp the rib cage when viewed from above cavity.

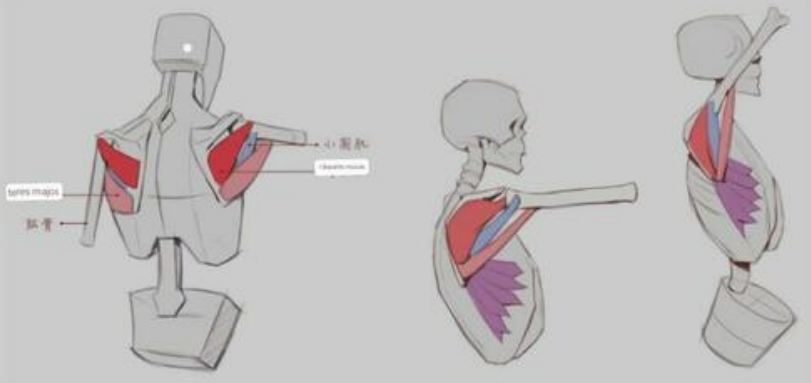


Let's look at the attachment of the muscles above the scapula. The infraspinatus rotates the arm laterally and acts to stabilize the shoulder joint and humeral head. The teres major and minor muscles sandwich the arm and twist each other when the humerus rotates, with the teres major attached to the medial side of the humerus and the teres minor attached to the lateral side.



The performance of the scapula muscles is shown below.

The dynamic changes of the scapula and muscle groups are as follows.

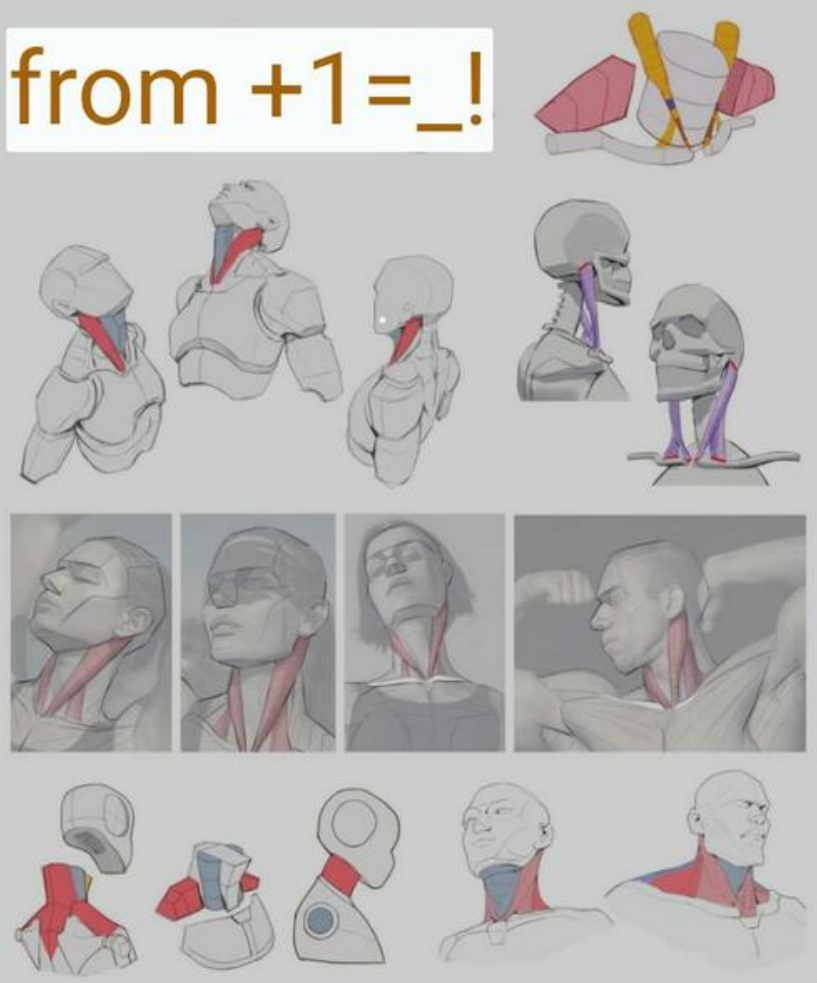


2.4.2 Influence of sternocleidomastoid muscle on body surface performance

The sternocleidomastoid muscle is located on both sides of the neck, most of which are covered by the platysma. The sternocleidomastoid muscle on one side contracts to flex the head to the same side and the face turns to the opposite side; the sternocleidomastoid muscle on both sides contracts at the same time

The head can be tilted back. In daily life, the movement of our head and neck twisting is formed by the contraction of the sternocleidomastoid muscle.

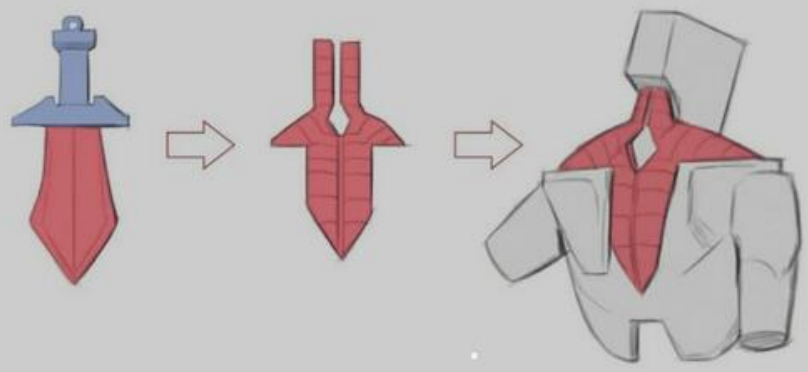
from +1=_!



2.4.3 Influence of trapezius muscle on body surface performance

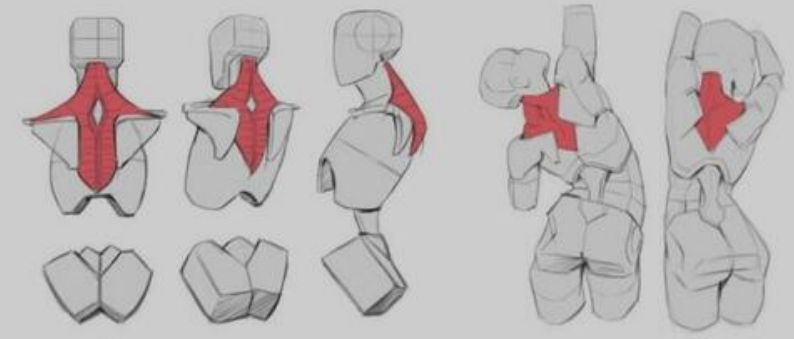
The rotation, elevation and pulling of the scapula mainly depend on the movement of the trapezius muscle, which originates from the base of the brain and descends to the twelve thoracic vertebrae. The trapezius grows along the lateral third of the clavicle and the upper edge of the scapula and inserts at the spinal tubercle.

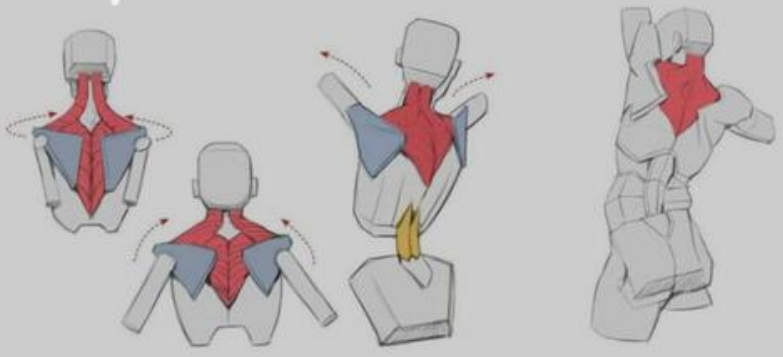
The trapezius muscle is simplified into the shape of a dagger, the handle of the dagger is the base of the skull, the two sides of the dagger are the muscles of the scapula, and the blade is vertically downward along the spine.

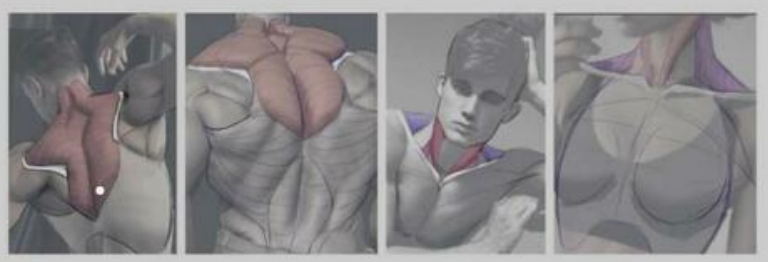


The trapezius muscle junction is shown below.

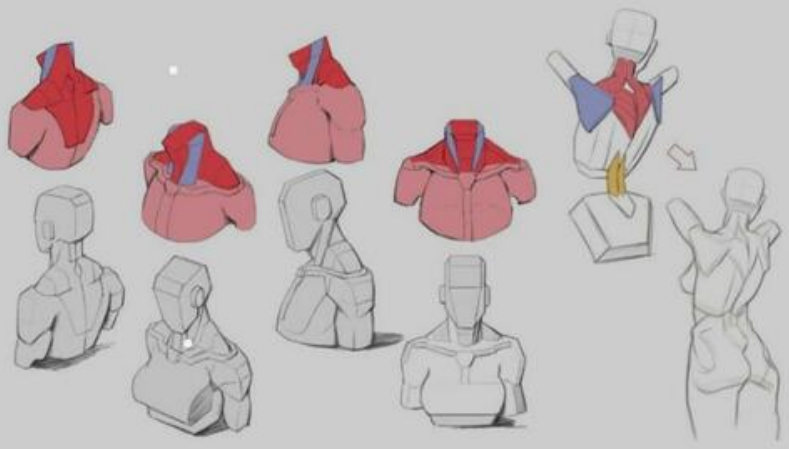
The trapezius carries the movement of the head, neck and shoulders. As the scapulae on both sides come closer together, the trapezius muscle contracts and bulges. When the scapula is extended forward, the trapezius becomes thinner and pulls the lower rib.







The relationship between the neck and shoulder structure is shown as follows.



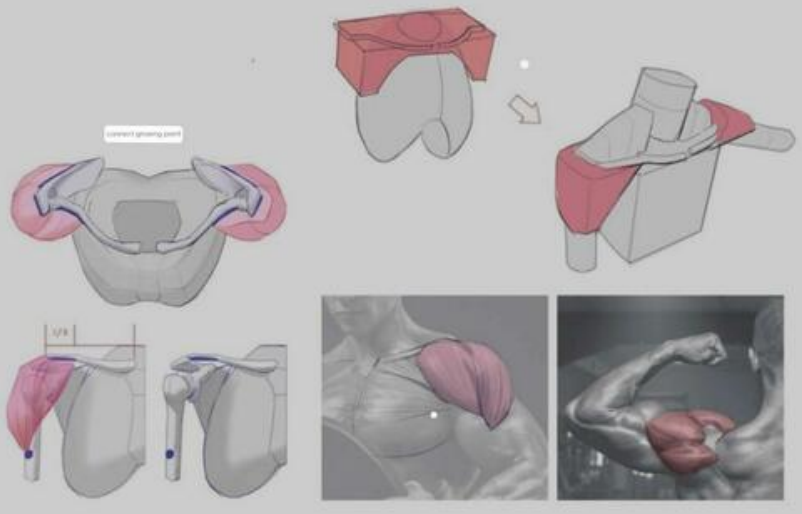
2.4.4 Influence of deltoid body surface performance

The anatomical analysis of the deltoid muscle is as follows.

Location: Under the skin of the shoulder, it is an inverted triangle.

Origin: lateral half of clavicle, acromion and spine of scapula.

Insertion: Deltoid tuberosity of body of humerus.



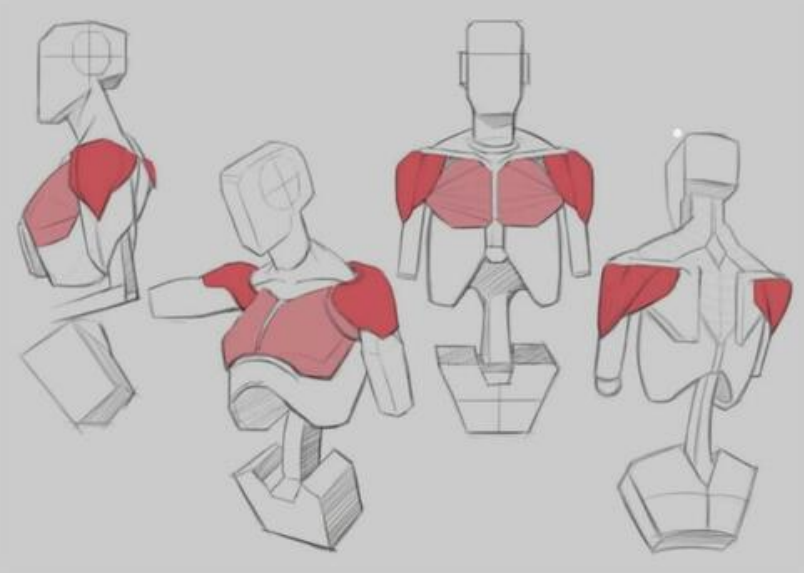
Function: During near fixation, the anterior fibers contract to flex, horizontally flex and internally rotate the shoulder, the middle fibers contract to abduct the shoulder, and the posterior fibers contract to extend, horizontally, and externally rotate the shoulder; during distal fixation, the overall contraction , which can abduct the shoulder joint.

Viewed from the side, the deltoid is shaped like an inverted triangle, and the deltoid is also triangular when viewed from the front or back.

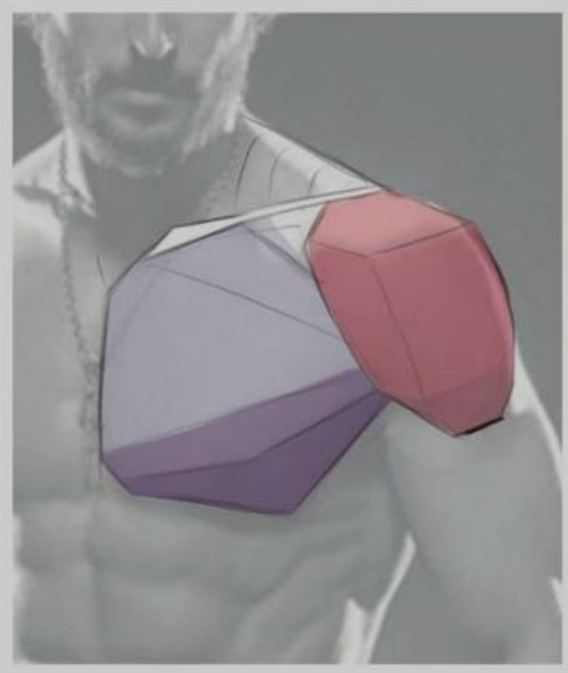
front

side

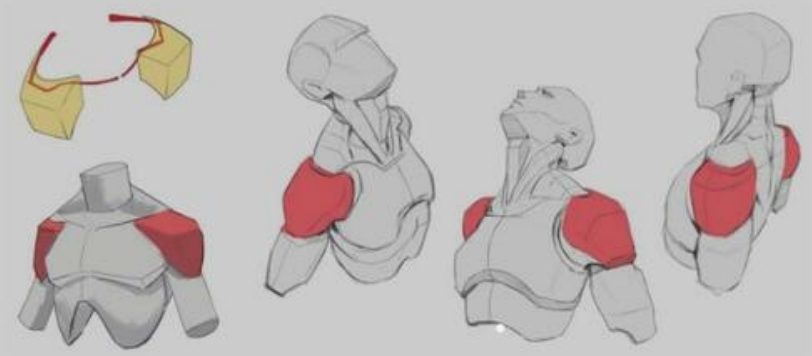
The deltoid muscle performance is shown below.



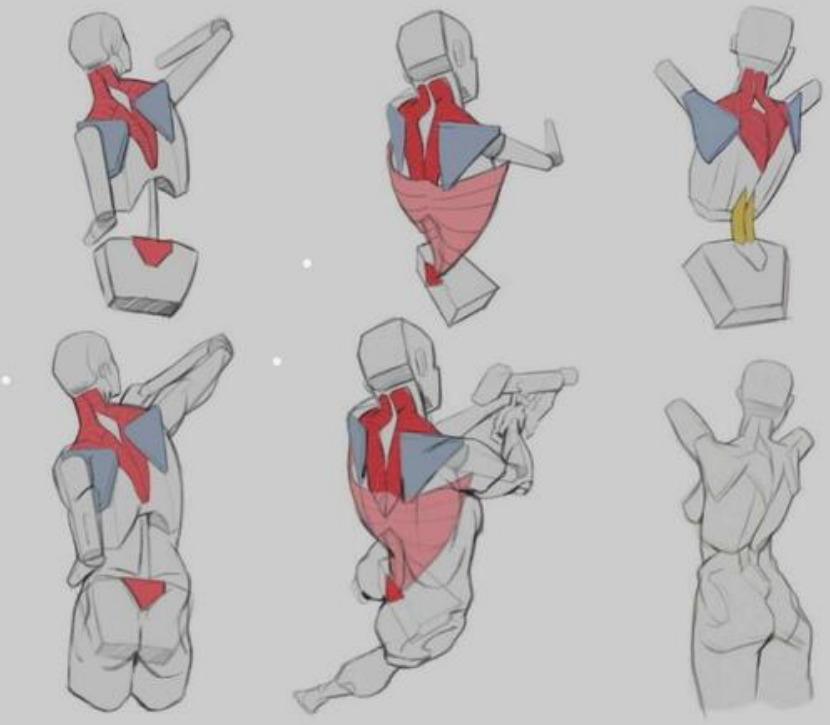
The structure of the trunk deltoid muscle at different angles is as follows.



The dynamic structure of the deltoid is as follows.

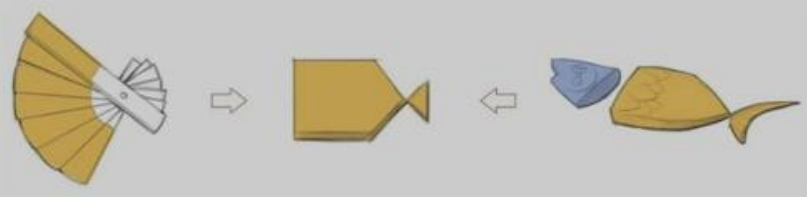


The dynamic structure of the deltoid muscles in the back is shown as follows.



2.4.5 Influence of pectoralis major on body surface performance

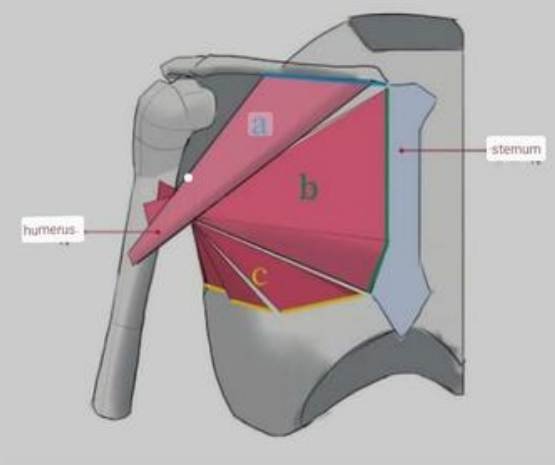
The anatomical analysis of the pectoralis major is as follows.



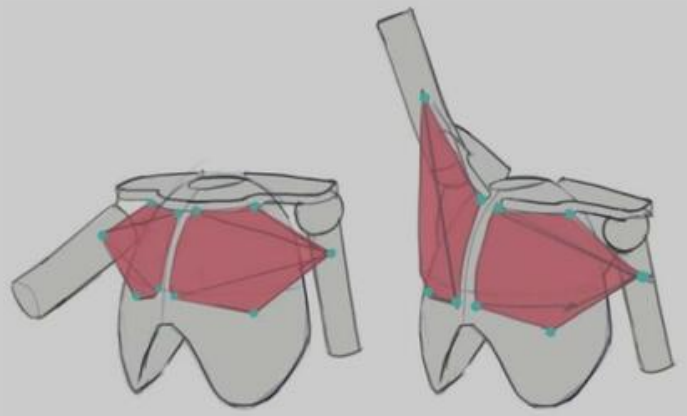
Location: Under the skin on the upper part of the chest.

Origin: a 3/5 of the clavicle; b sternum position; c rib

Insertion: Greater tuberosity ridge of humerus



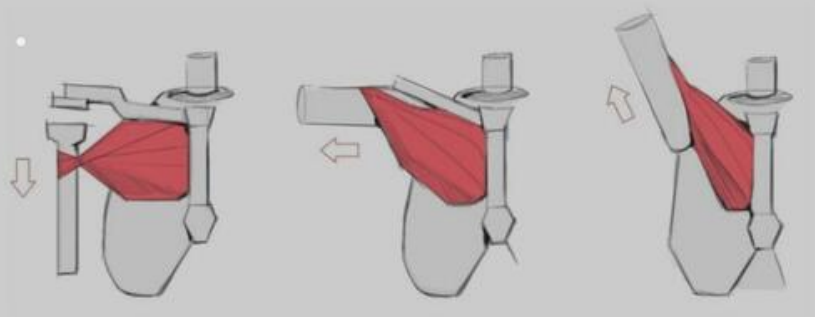
The pectoralis major junction is shown below.



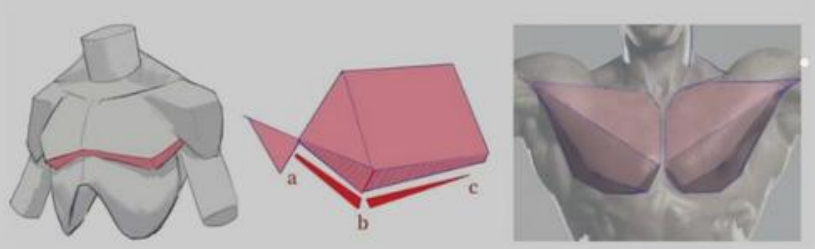
Function: In near fixation, the shoulder joint is flexed, horizontally flexed, adducted and internally rotated; in far fixation, the trunk is pulled closer to the upper arm, and the ribs are raised to assist inhalation.

When drawing the pectoralis major, we can think of it as a fan, or a headless

fish, so that we can better understand the structure of the pectoralis major and the relationship between the muscles. As the arm is raised, the rotational contraction and stretching of the pectoralis major is shown below.

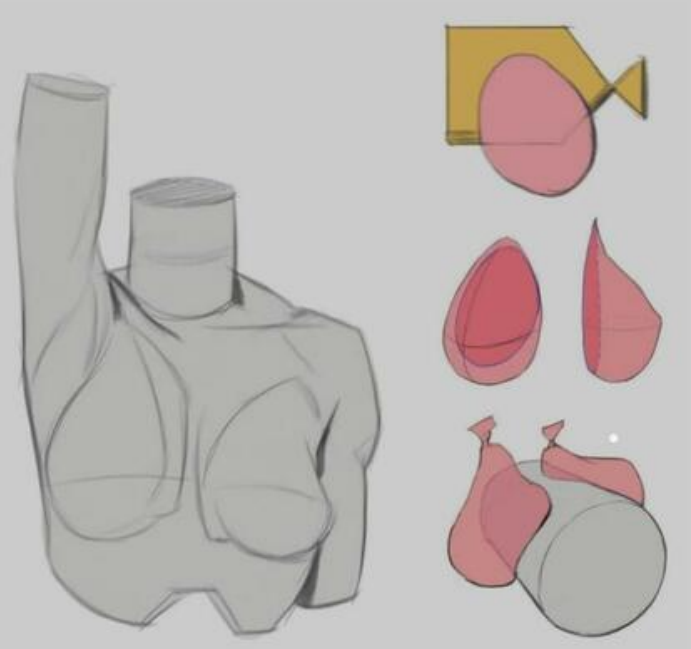


The three-dimensional geometric representation of the pectoralis major is shown below.

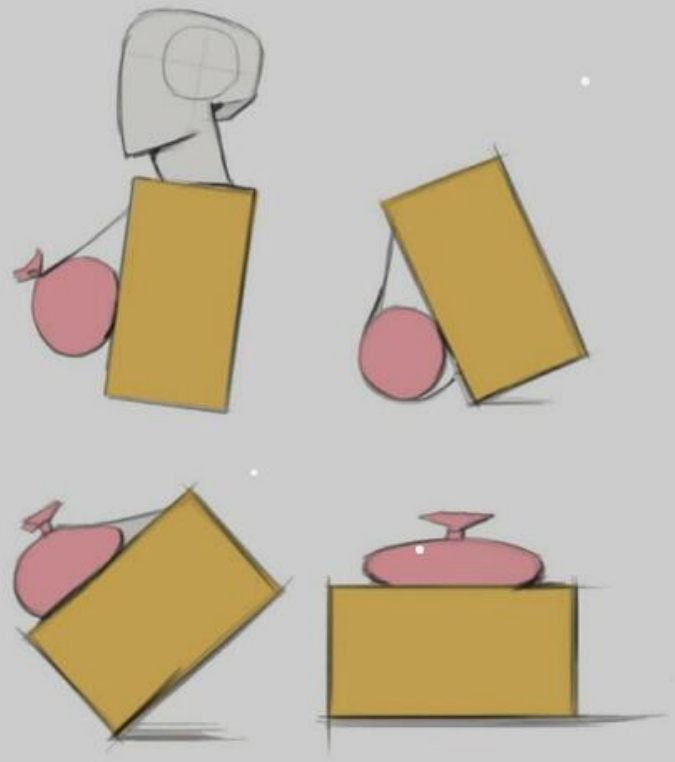


The thickest part of the chest

When drawing women's breasts, many people mistake the breast and the pectoralis major as one part. In fact, the two are separate, and the breasts grow above the pectoralis major.



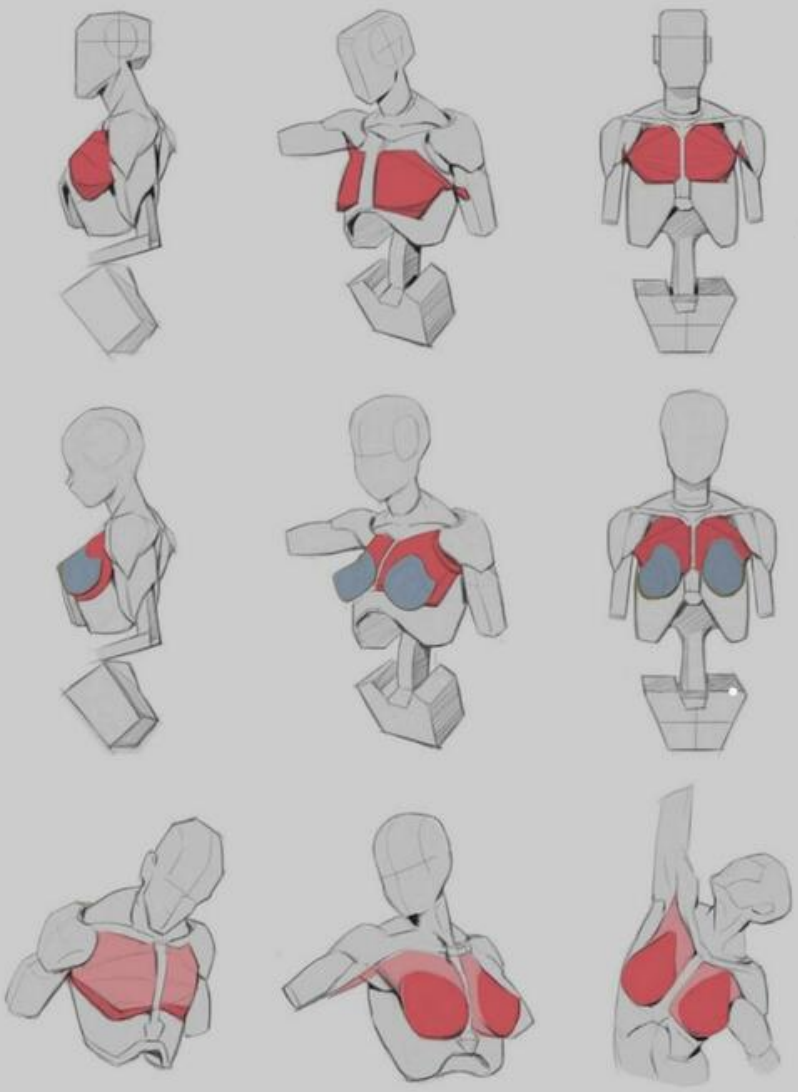
When a woman does some exercise, the shape of the breast changes with gravity and compression.



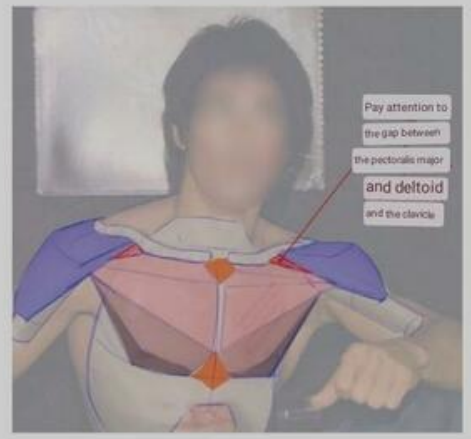
When expressing the chest, not only should pay attention to the chest is attached to the chest, but also pay attention to the direction of the chest contour.

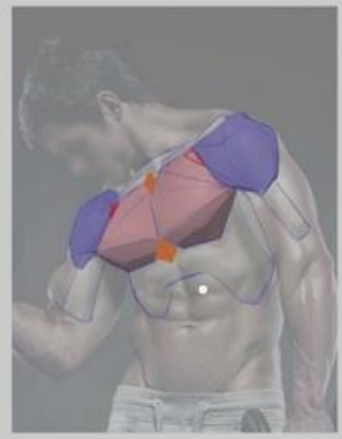
The volume structure of the chest is illustrated as follows.

The structure of the pectoralis major muscle of the torso at different angles is shown below.



The basic performance of muscles is shown below.





Muscle changes are shown below.

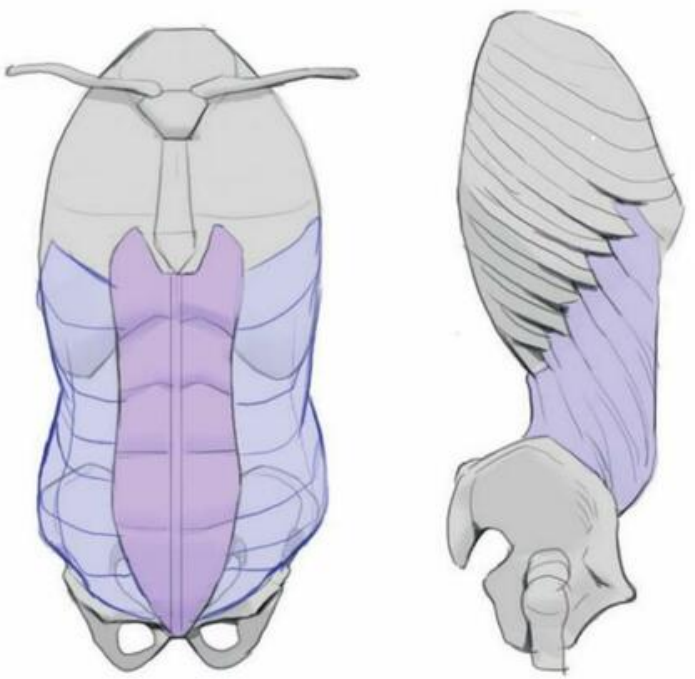
2.4.6 Influence of external oblique muscle on body surface performance

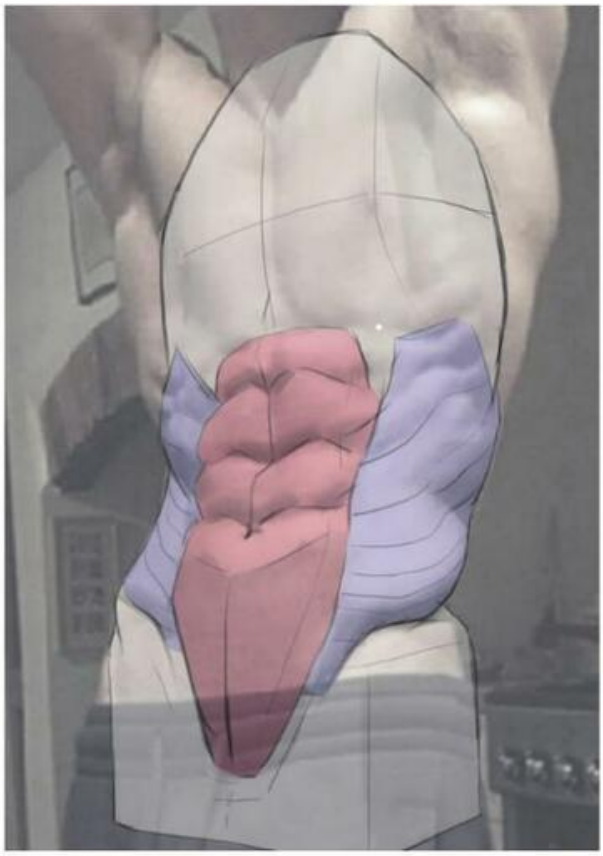
The anatomical analysis of the external oblique muscle is as follows.

Location: The superficial layer of the anterolateral lateral wall of the abdomen, the muscle fibers run obliquely from the outside to the inside and the inside.

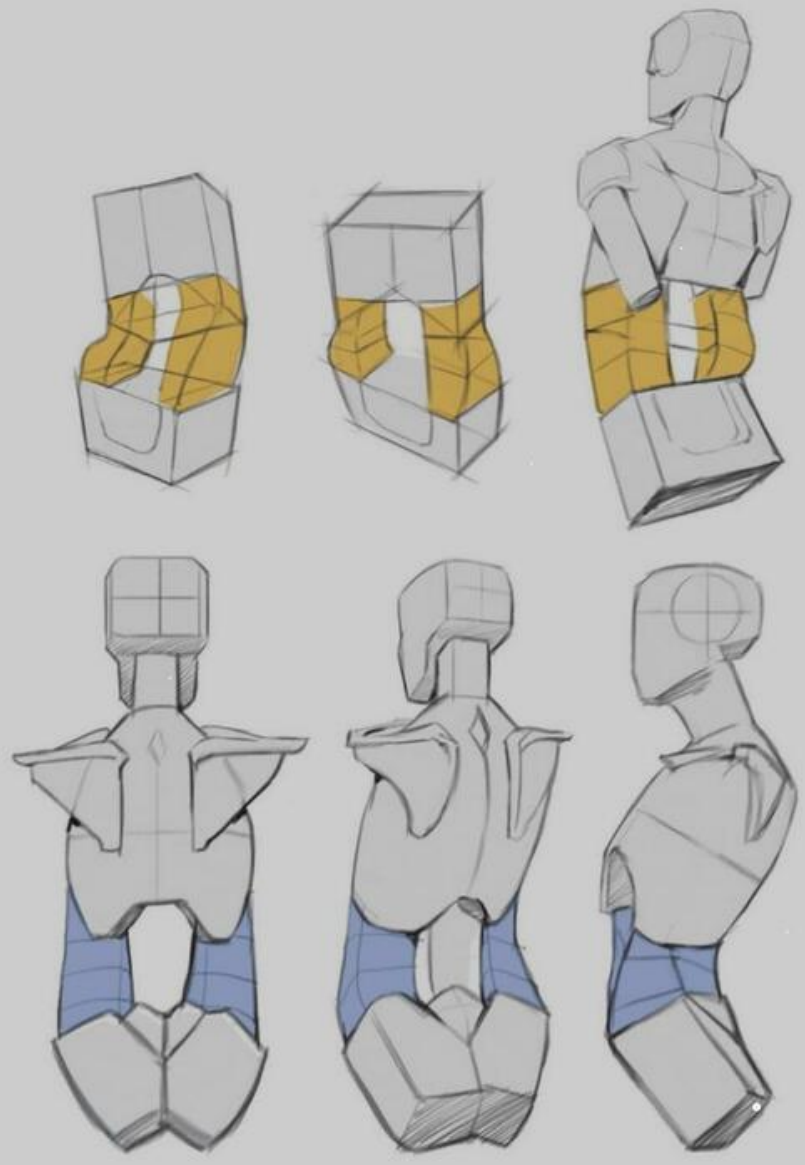
Origin: The lateral surface of the 5th to 12th ribs.

Insertion point: iliac crest, pubic tubercle and linea alba, and its aponeurosis participates in forming the anterior wall of the rectus sheath.

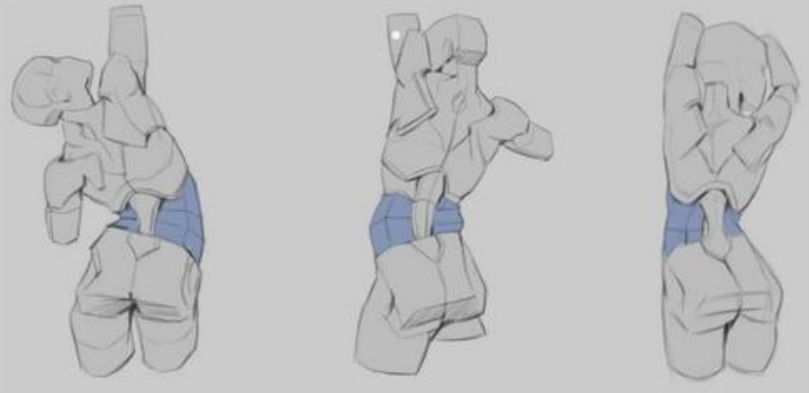




Function: During the upper fixation, the two sides are contracted to make the pelvis tilt backward; when the lower fixation is performed, one side is contracted, so that the spine is flexed to the ipsilateral side and rotated to the opposite side. When drawing the external oblique muscle, we can imagine the external oblique muscle as two rectangular pieces of fondant, supporting the ribcage above the pelvis.



When performing twisting motion, Remember that the thickness of the external oblique muscle does not change as it is twisted.



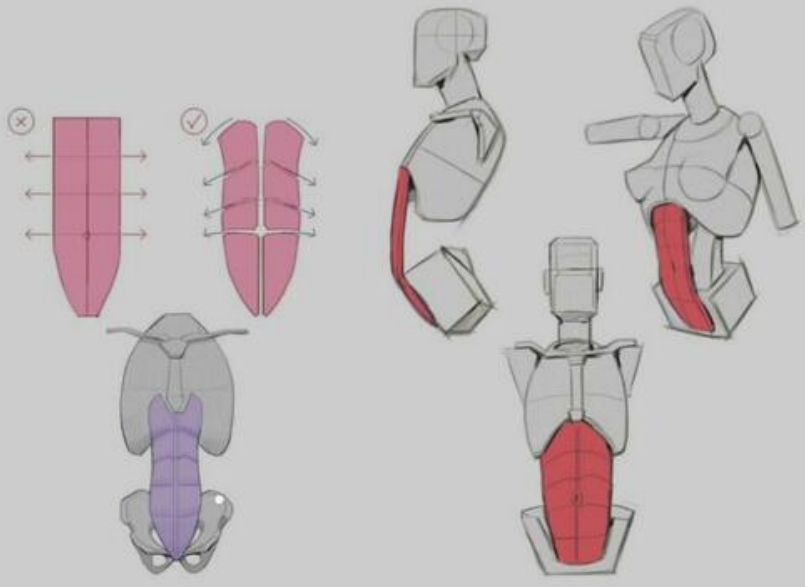
2.4.7 Influence of rectus abdominis on body surface performance

The anatomical analysis of the rectus abdominis is as follows.

Location: Both sides of the midline of the anterior abdominal wall.

Origin: the upper border of the pubic bone.

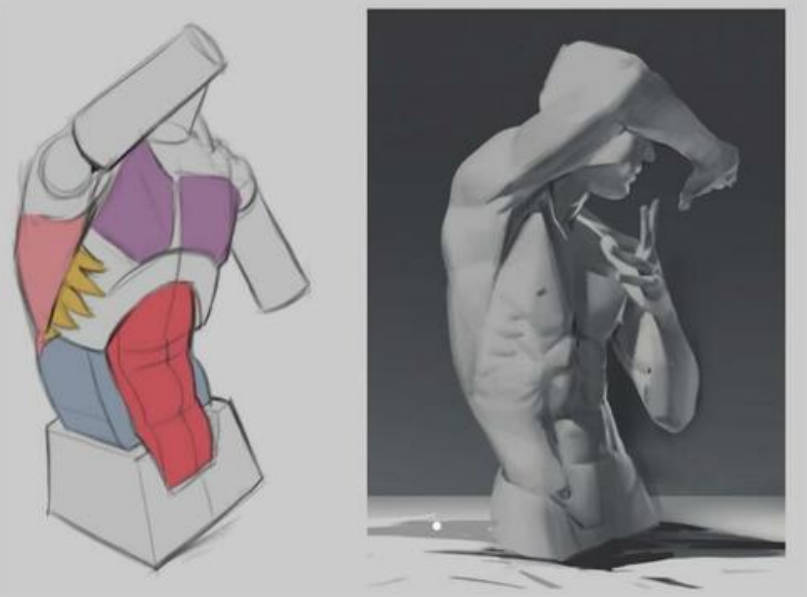
Insertion: Anterior to the xiphoid process of the sternum and the 5th to 7th costal cartilages.



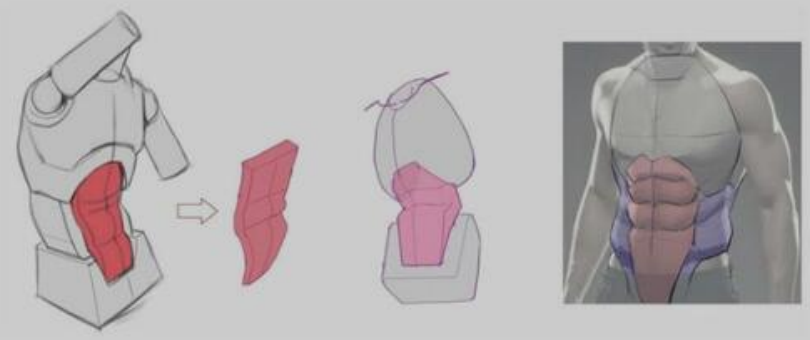
Function: When the upper fixation is performed, the two sides are contracted to make the pelvis tilt backward; when the lower fixation is performed, the shrink on one side,

Bend the spine to the same side.

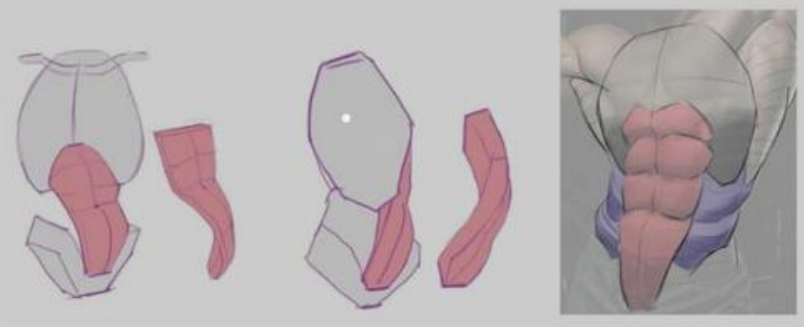
The rectus abdominis and the external oblique are the key muscles that support the twisting of the waist, and the shape changes caused by squeezing and stretching these two muscles during twisting are very obvious.



Basic analysis of muscle shape



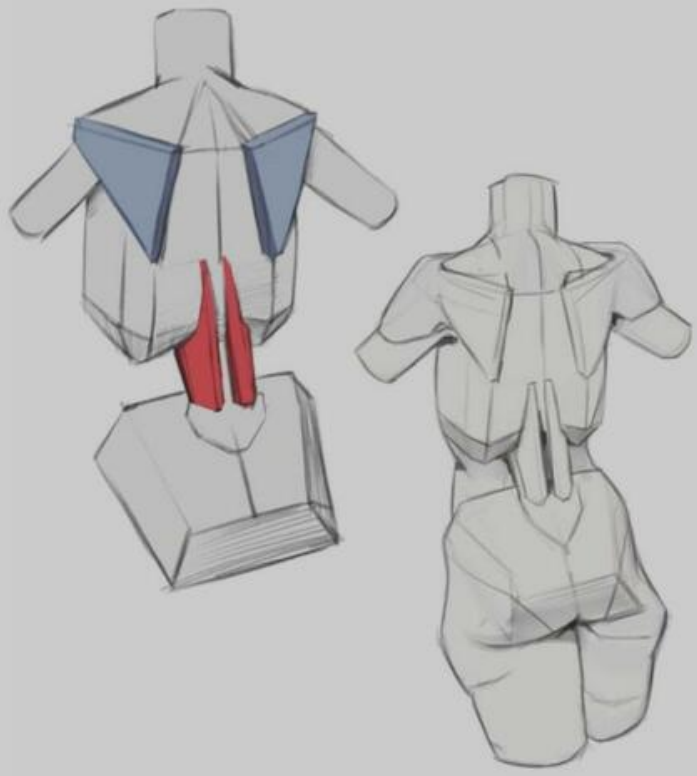
The morphological changes of the muscles when the rectus abdominis is squeezed



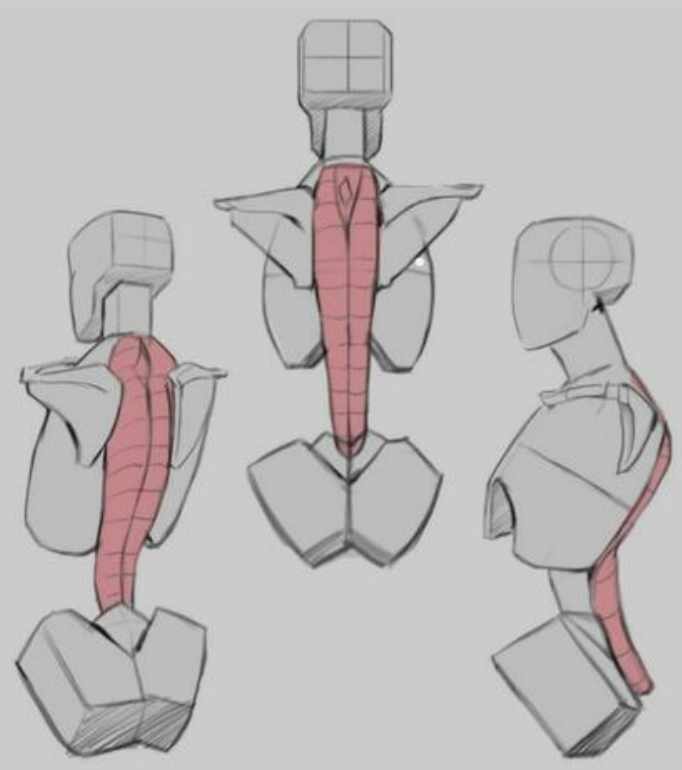
The morphological changes of the rectus abdominis when the rectus abdominis is twisted from side to side

2.4.8 Influence of erector spinae on body surface performance

The erector spinae is a muscle group that reaches up to the head and down to the sacrum. It is the middle muscle of the back muscles and participates in the bending and rotation of the trunk.



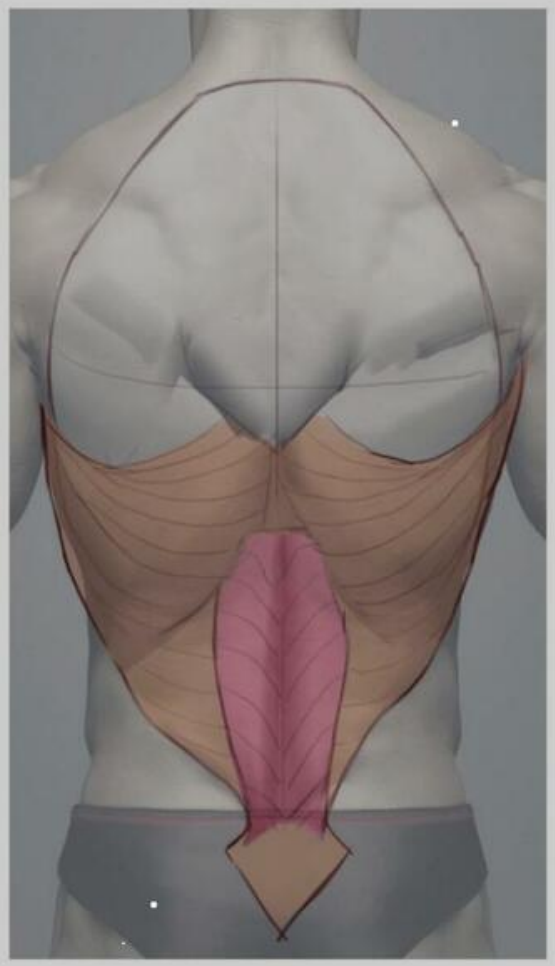
The erector spinae can be reduced to two side-by-side sausages.



hint

When expressing the three-dimensional sense of the erector spinae, the perspective between the spine, thorax and pelvis should be followed.

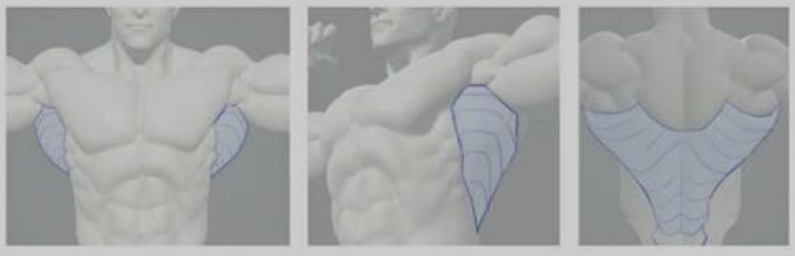
Visual and volume relationships.



2.4.9 The effect of latissimus dorsi on body surface performance

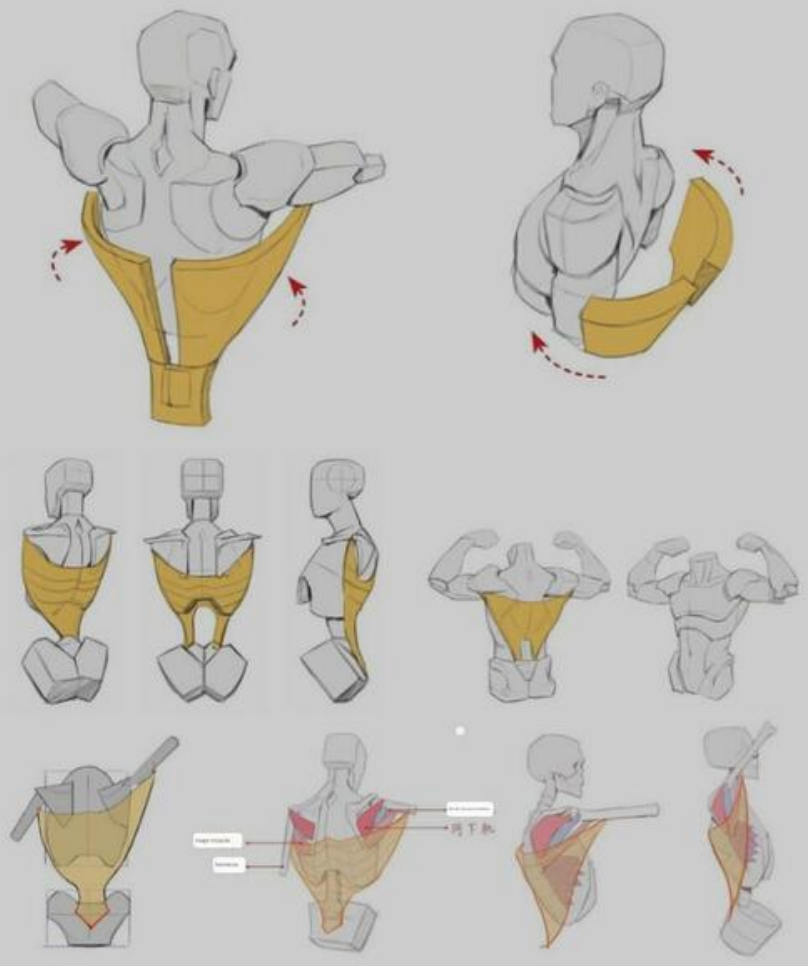
We can associate the latissimus dorsi with the trapezius muscle, the trapezius muscle is the sword, and the latissimus dorsi is the shield. When drawing the latissimus dorsi note that it wraps around the ribcage.

The latissimus dorsi is a key muscle in lowering the arm and raising the body, and it adducts, extends, and rotates the humerus. The latissimus dorsi inserts into the anterior end of the humerus from the sixth thoracic vertebra and the iliac crest.



Think of the latissimus dorsi as a triangle that wraps around the ribcage, with the tips on both sides of the triangle

Front end of humerus.



Schematic representation of the change relationship of the latissimus dorsi during exercise changes

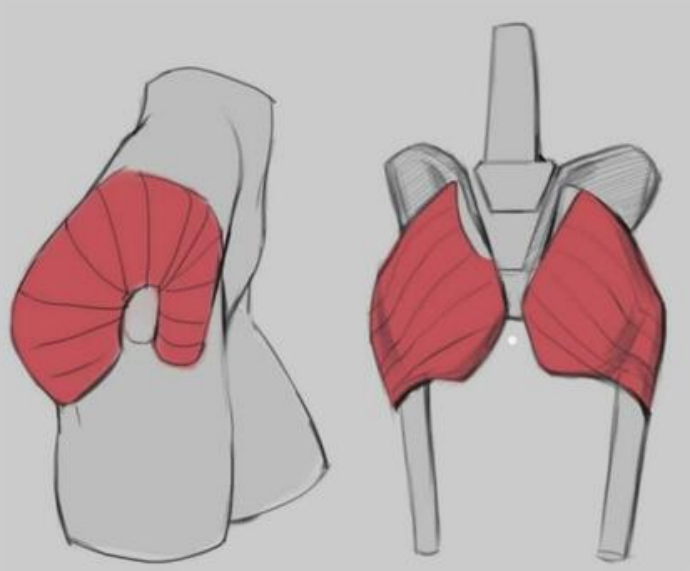
The different styles of latissimus dorsi are shown below.

hint

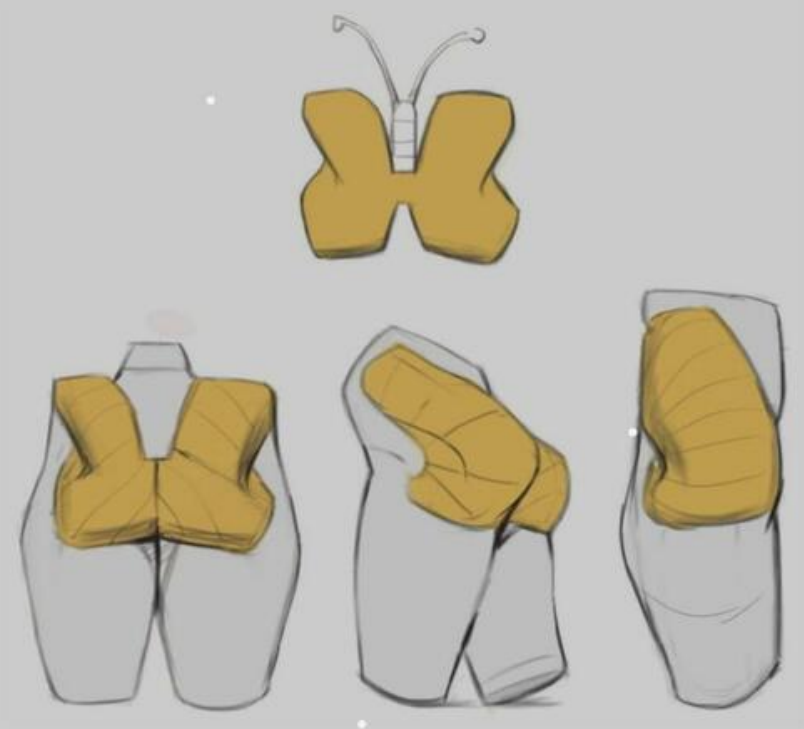
The teres major is surrounded by the latissimus dorsi.

2.4.10 Influence of gluteus maximus on body surface performance

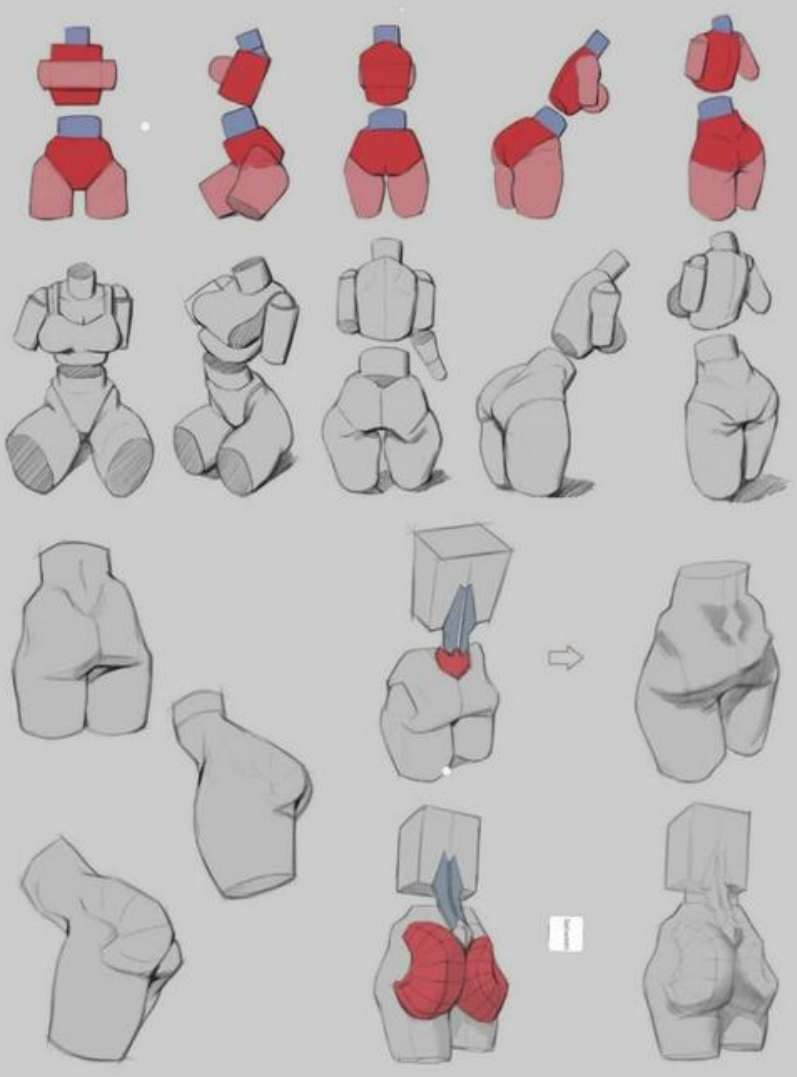
The gluteus maximus is a broad quadrilateral, located under the skin of the buttocks, originating from the outside of the ilium wing and the back of the sacrum, with fibers obliquely downward and outward, covering the greater trochanter, and inserting into the gluteal tuberosity of the femur.



The buttocks look like a butterfly from the back, and look like a croissant from the side leg.



The structure of the gluteus maximus is shown below.



2.4.11 Influence of serratus anterior on body surface performance

Location: The superficial layer of the lateral side of the thorax.

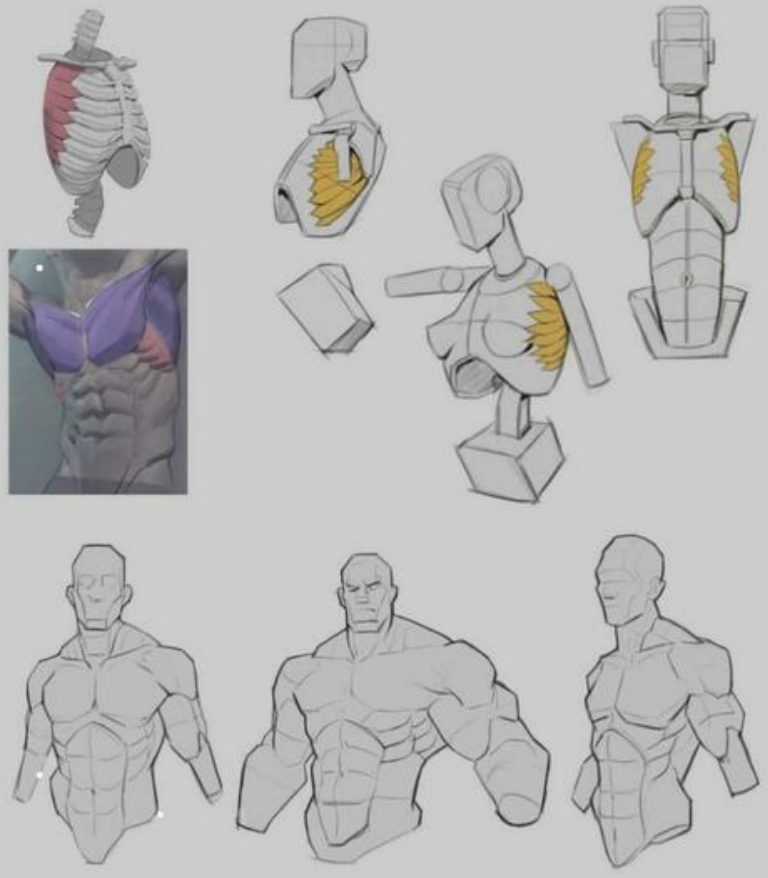
Origin: Lateral surface of upper 8-9 ribs.

Insertion: On the medial border of the scapula and in front of the lower corner.

Function: In the near fixation, the scapula is extended forward; in the far fixation, the contraction of the lower muscle fibers can make the scapula descend and rotate upward.

Simplify the serratus anterior to the shape of a scalloped shell and embrace the ribcage like a hand, which is more convenient

in memory.

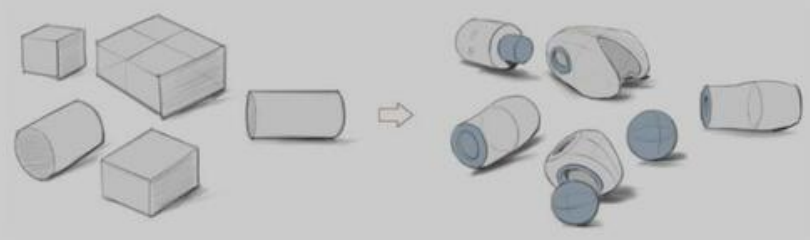


2.5 Simplified torso mass and muscles

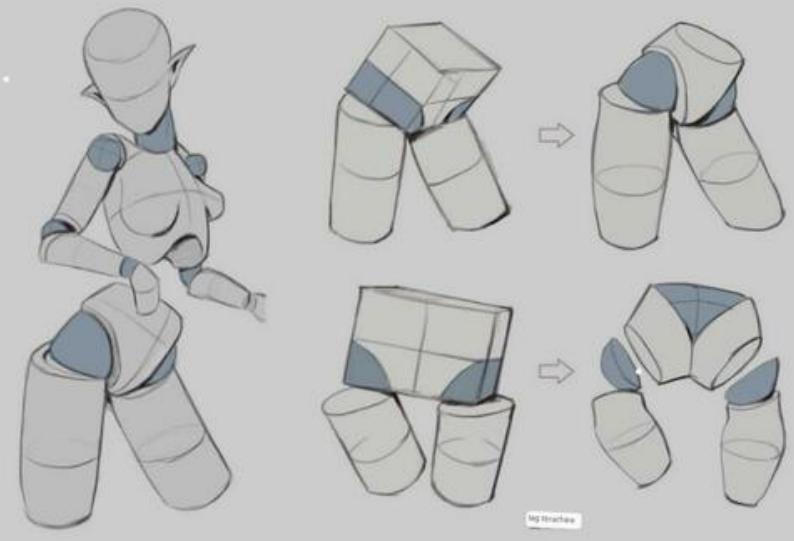
The structure of the human body is very complex. In order to quickly understand and master the structure of the human body, it is necessary to simplify and memorize it. This section will introduce the simplification of the torso structure and the simplification of the muscle structure.

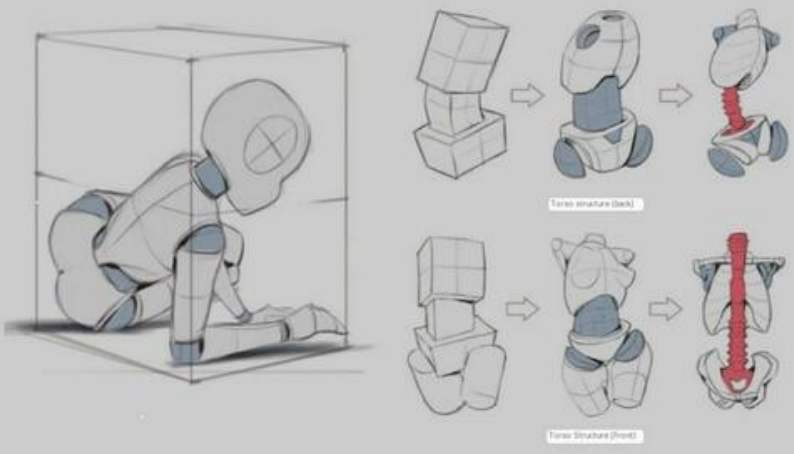
2.5.1 Simplify the torso block structure

Think of the human body as some simple structures, and then break it down. After disassembly, each part can be clearly seen, and the parts are generally connected by a sphere structure.



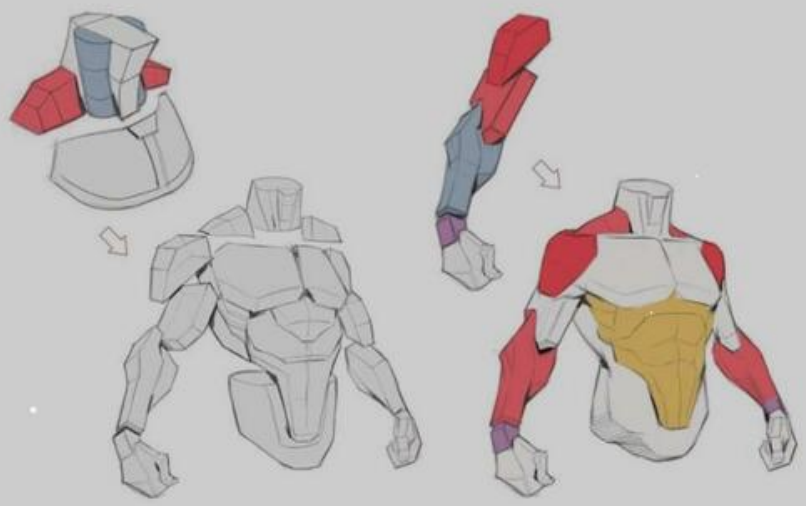
Connect the split blocks, pay attention to the interspersed relationship between the blocks.





2.5.2 Simplified trunk muscle structure

The muscle structure inside the torso can also be disassembled into geometric blocks, which is more helpful to strengthen memory and facilitate understanding.

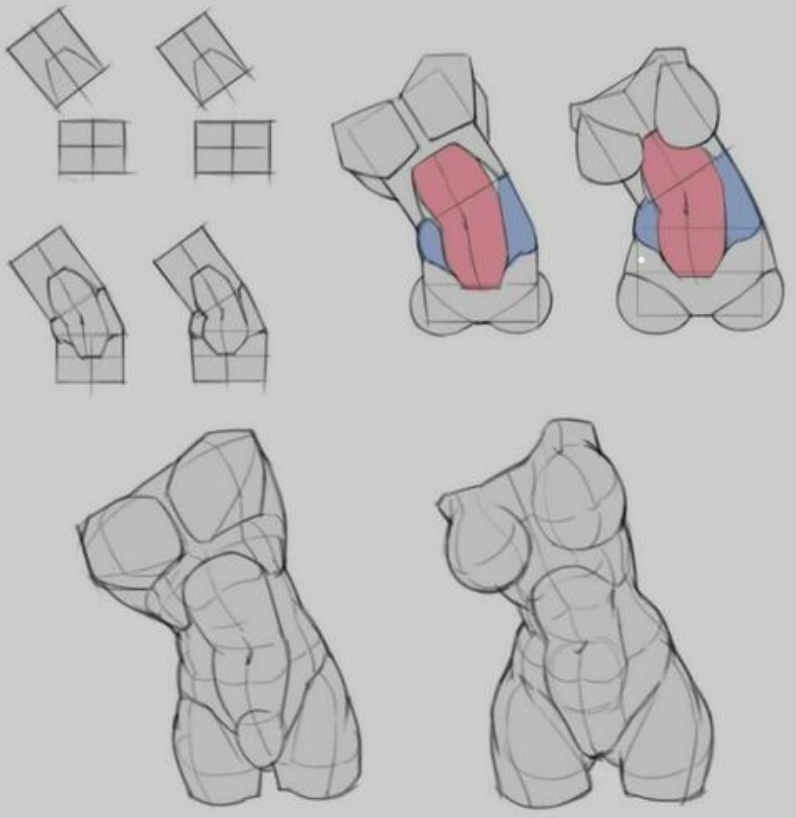


2.6 Torsion and dynamic performance of the torso

According to the different characteristics of the proportion of male and female torso, the human body can be divided into four types of torso twisting, namely left and right bending, backward bending, forward bending, and left and right twisting. Torsion of the torso does not exceed the limit of spinal curvature.

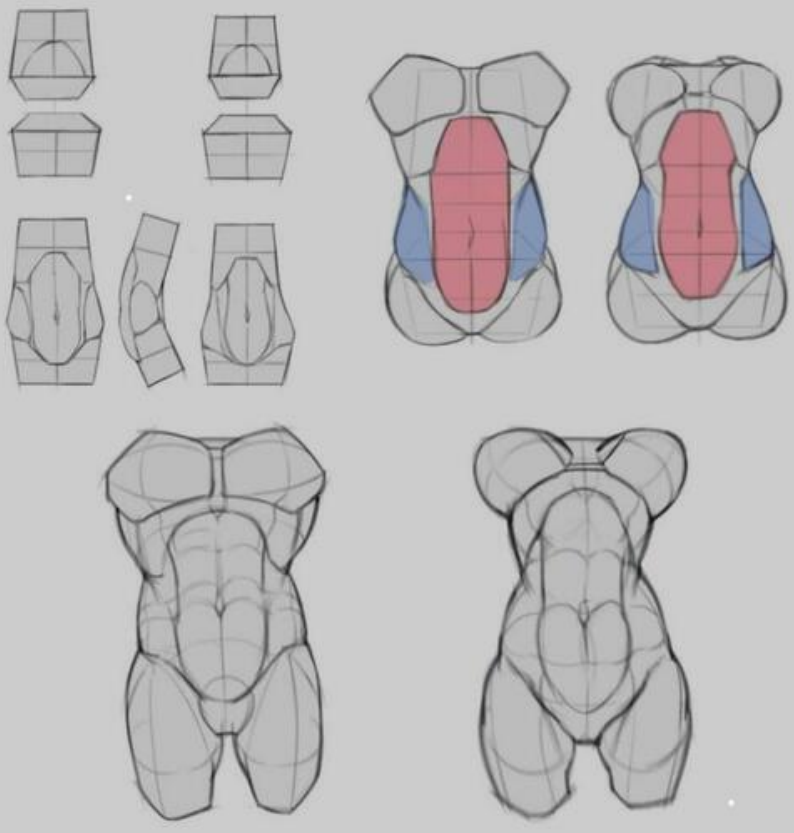
2.6.1 Left and right bending

When drawing the left and right curved torso, pay attention to the changes in the external oblique and rectus abdominis.



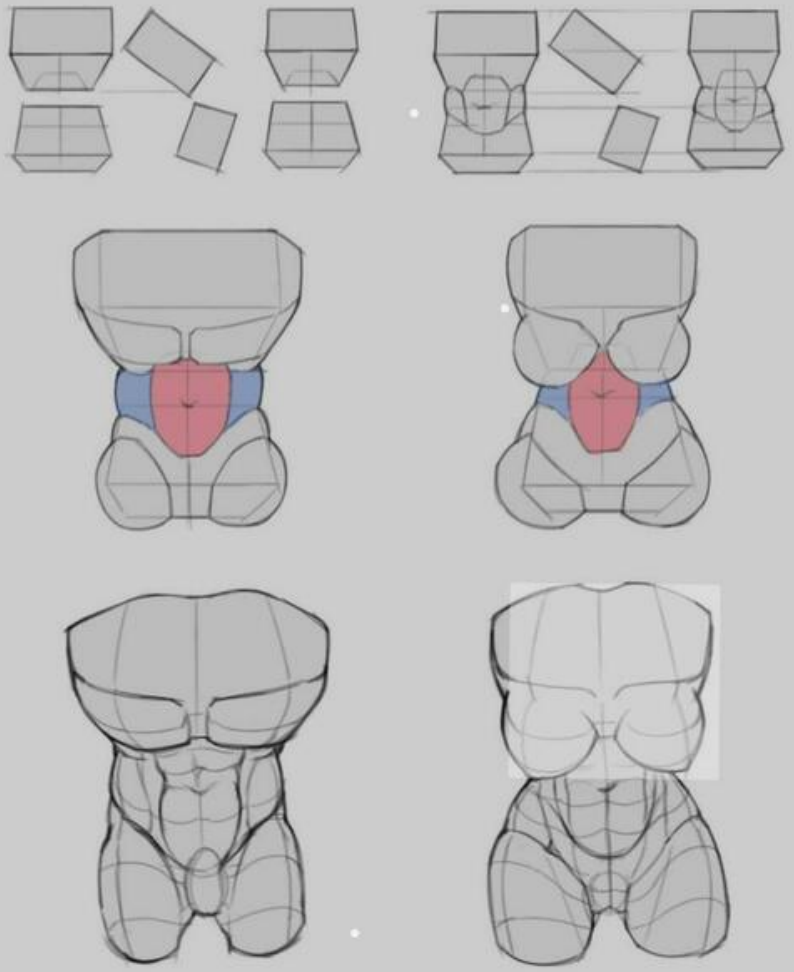
2.6.2 Bending back

When drawing the torso that is bent backwards, notice the change in stretch of the rectus abdominis.



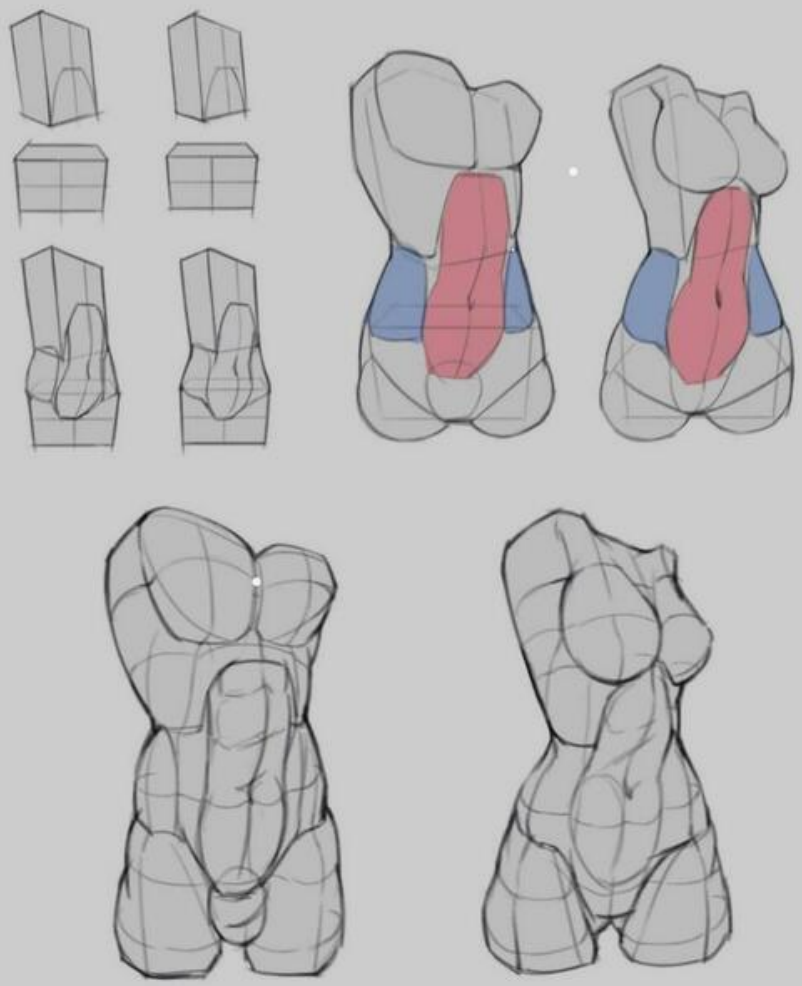
2.6.3 Bend forward

When the trunk is bent forward, the rectus abdominis is contracted, and the whole body is shorter when viewed from the front.



2.6.4 Left and right twist

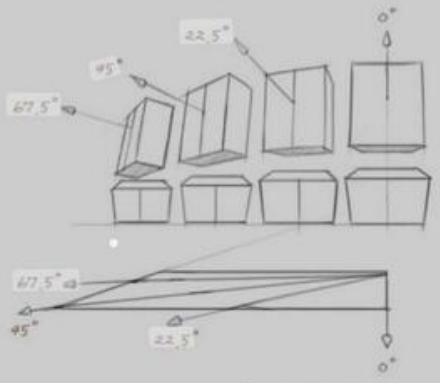
When the trunk is twisted left and right, the muscles will be twisted and stretched. Pay attention to the contrast between the contraction and stretch of the external oblique muscle on both sides, and the slight stretch change of the rectus abdominis.

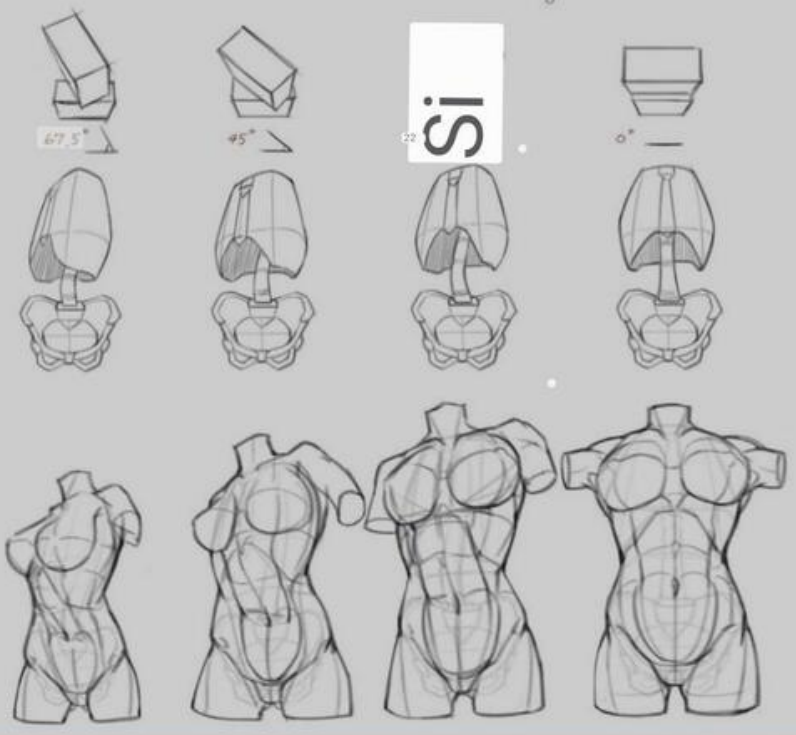


When twisting the ribcage and pelvis in different directions, note that the amount of twisting of the ribcage and pelvis is limited

of. Take the following picture as an example, the twisting range of the ribcage and pelvis should not exceed 60°, otherwise it will appear inappropriate.

nature.





Si

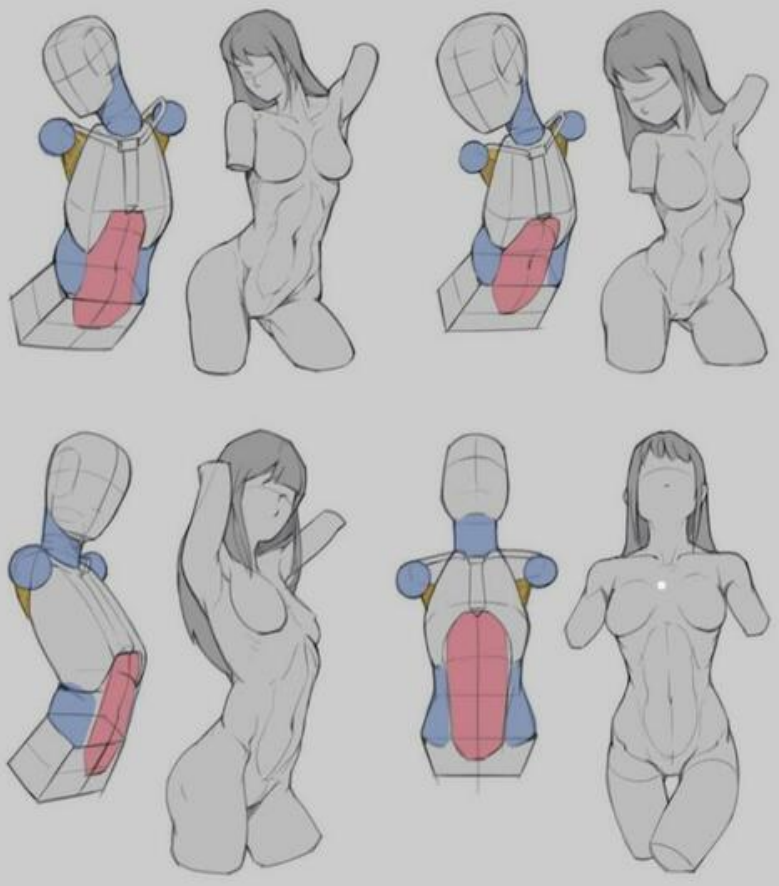
|Tips

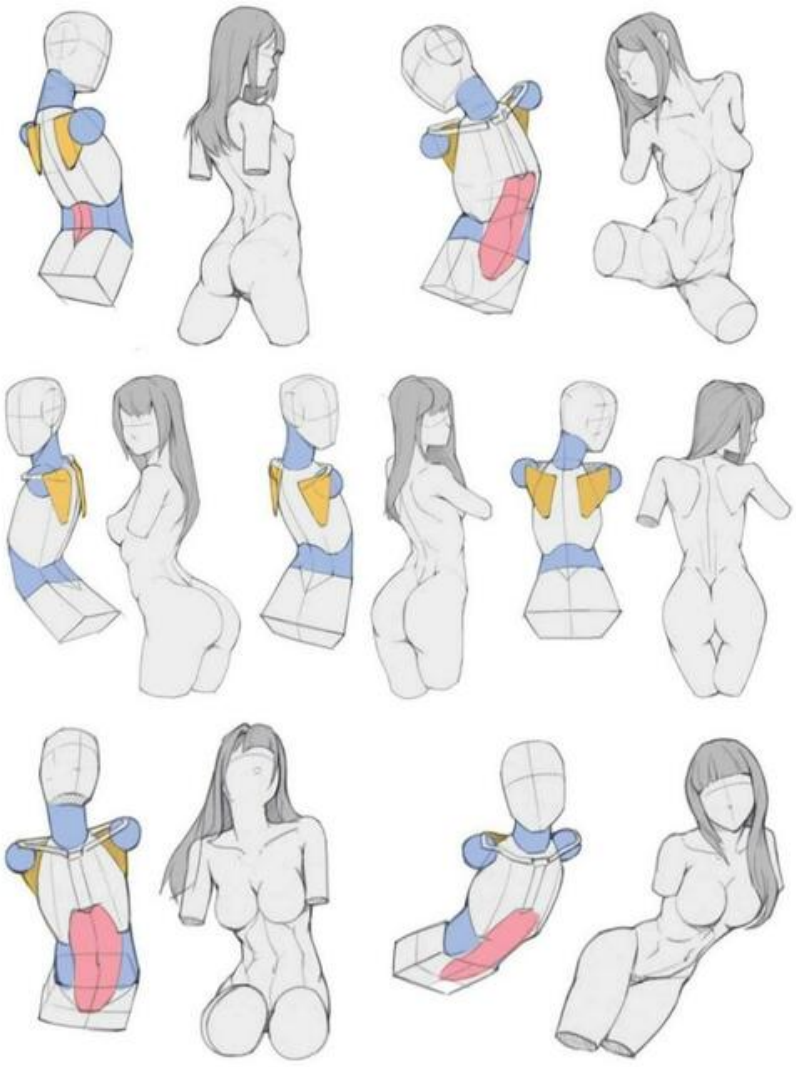
The dynamic torsion of the thorax and pelvis is also limited and cannot exceed the length of the human spine

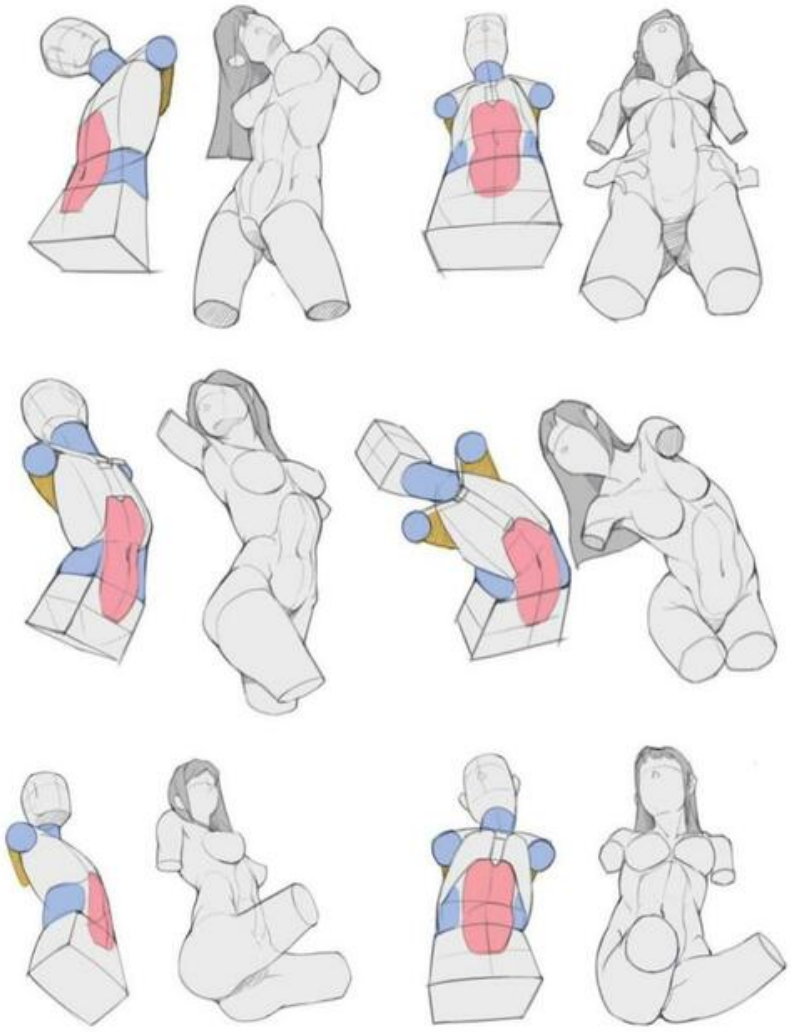
Every time

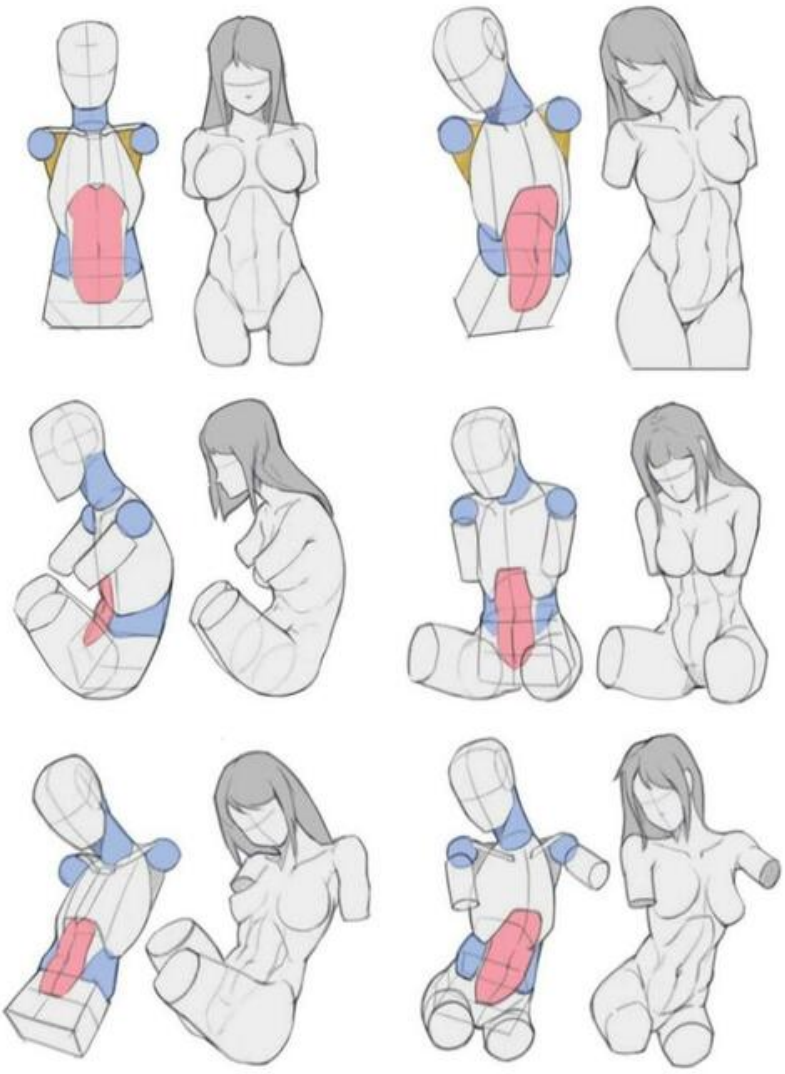
More special training

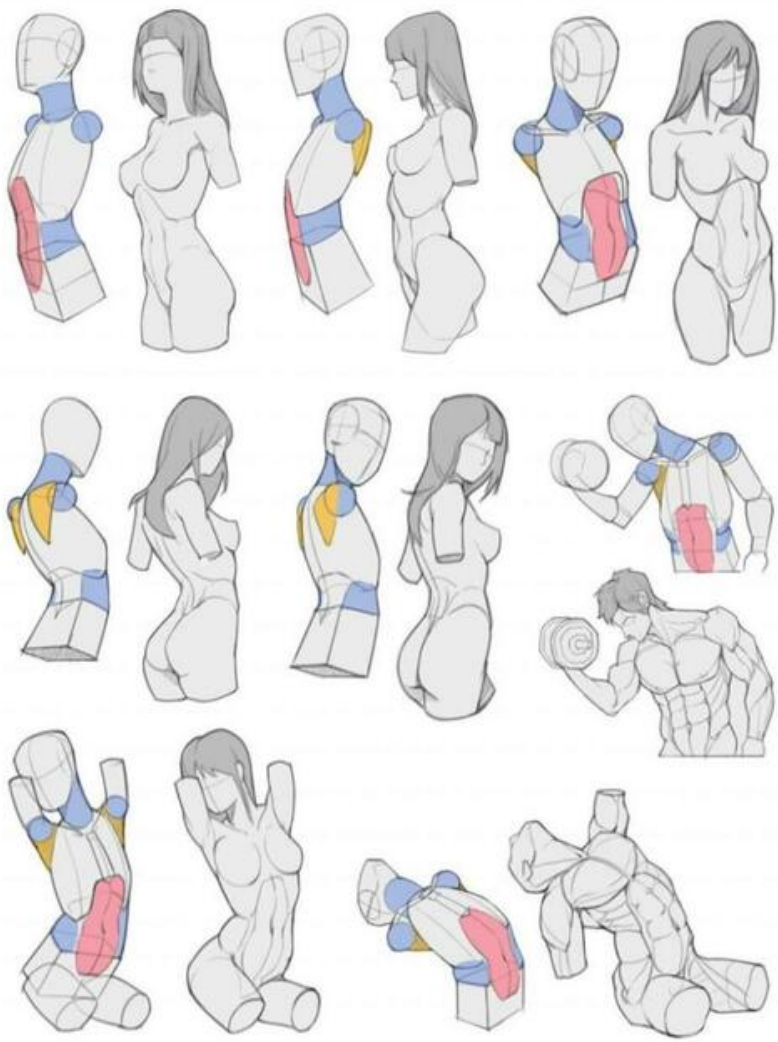
Refer to some photos to analyze the torso blocks of the characters, experience the dynamic laws of the torso, and then do a set of trunk performance exercises together with the head blocks. When practicing, you can try to change the proportions of the rib cage, pelvis, and head, and describe the human torso of different ages. Also try to draw human torso in different poses and angles.

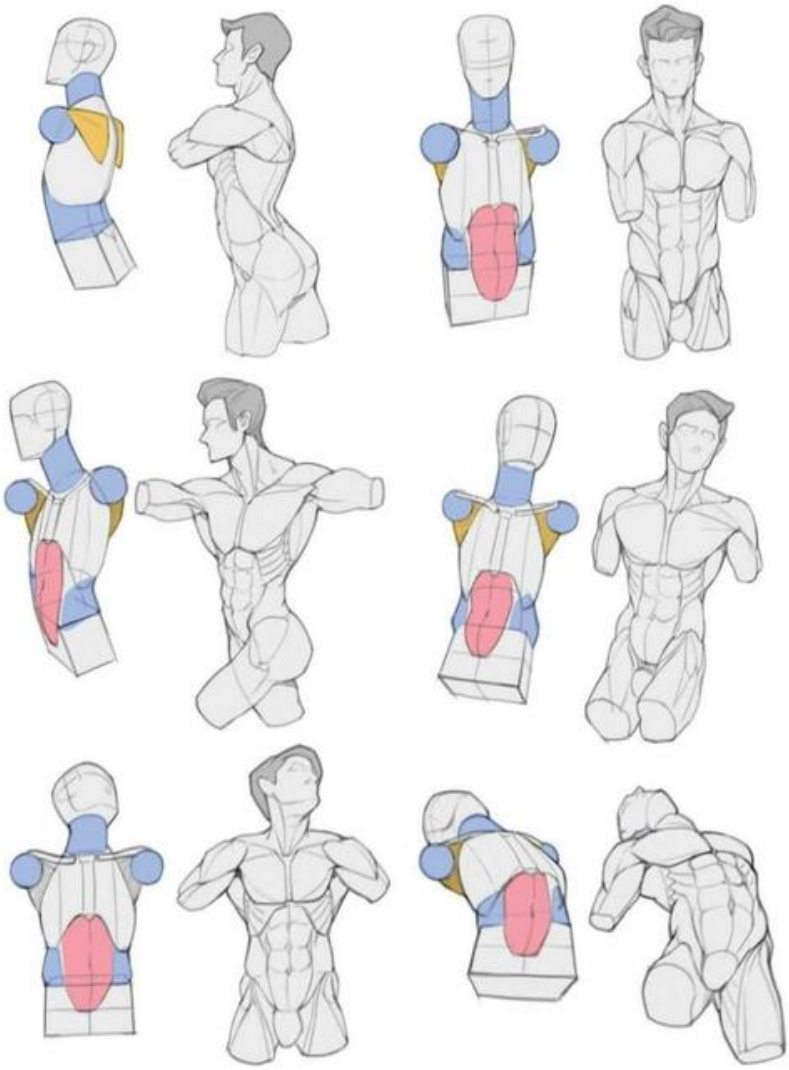


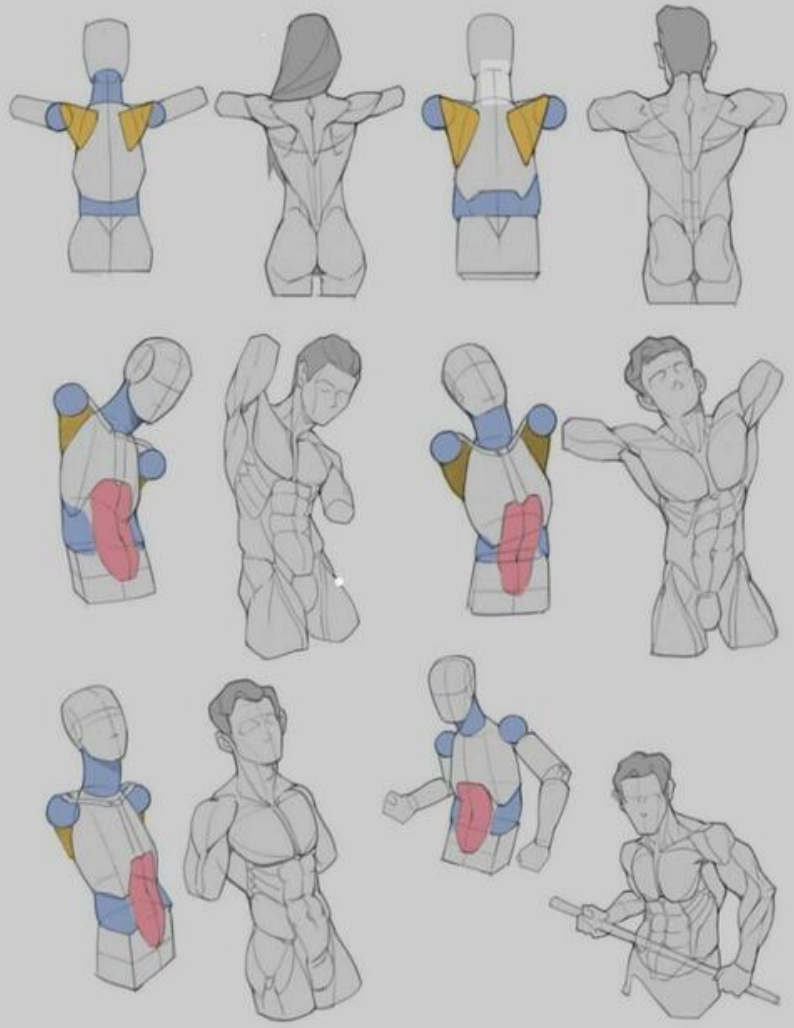




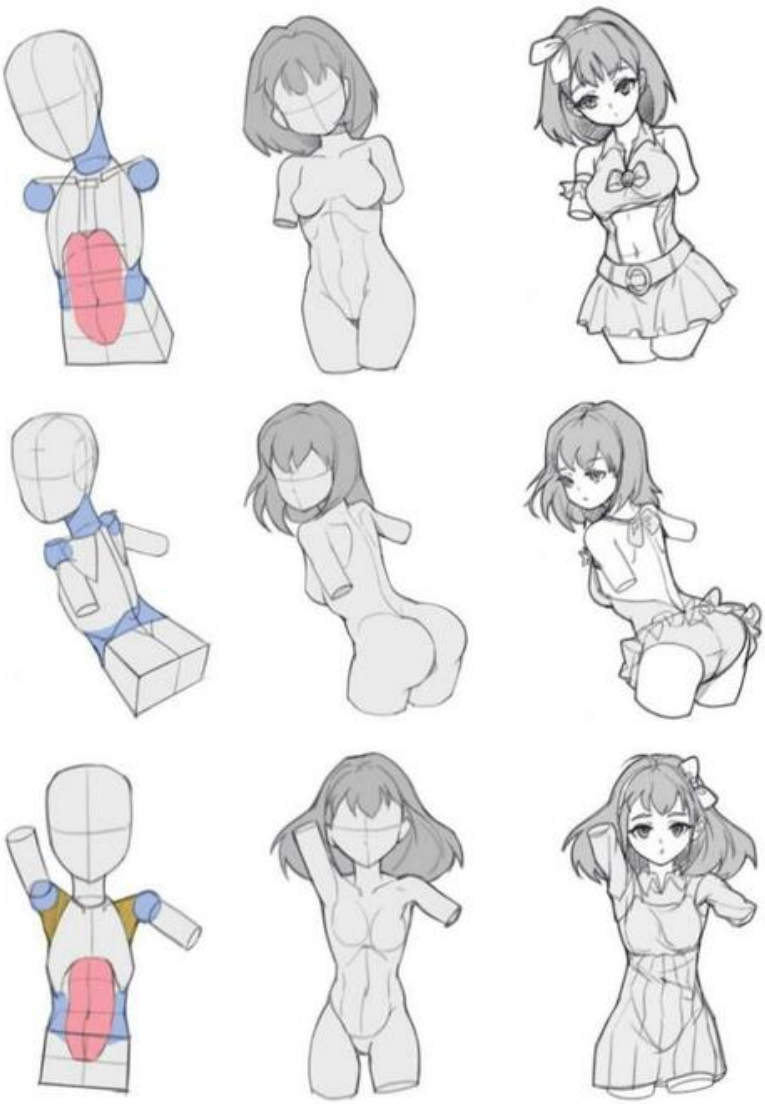


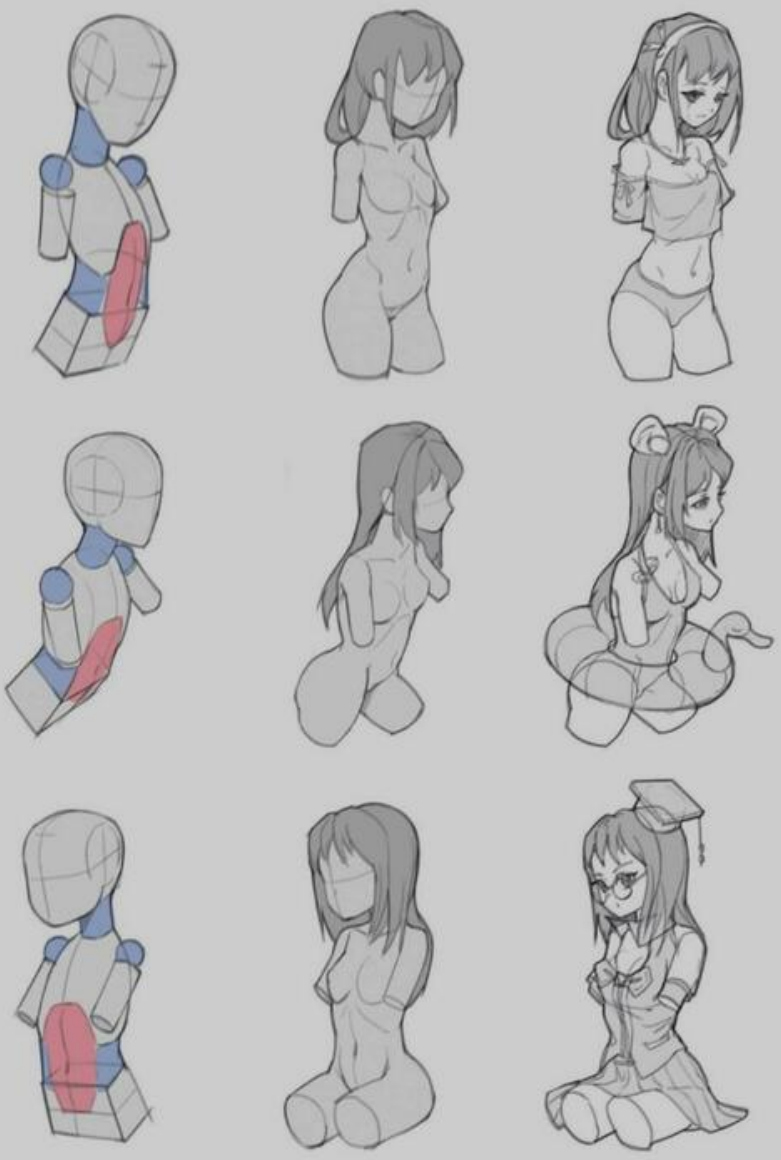




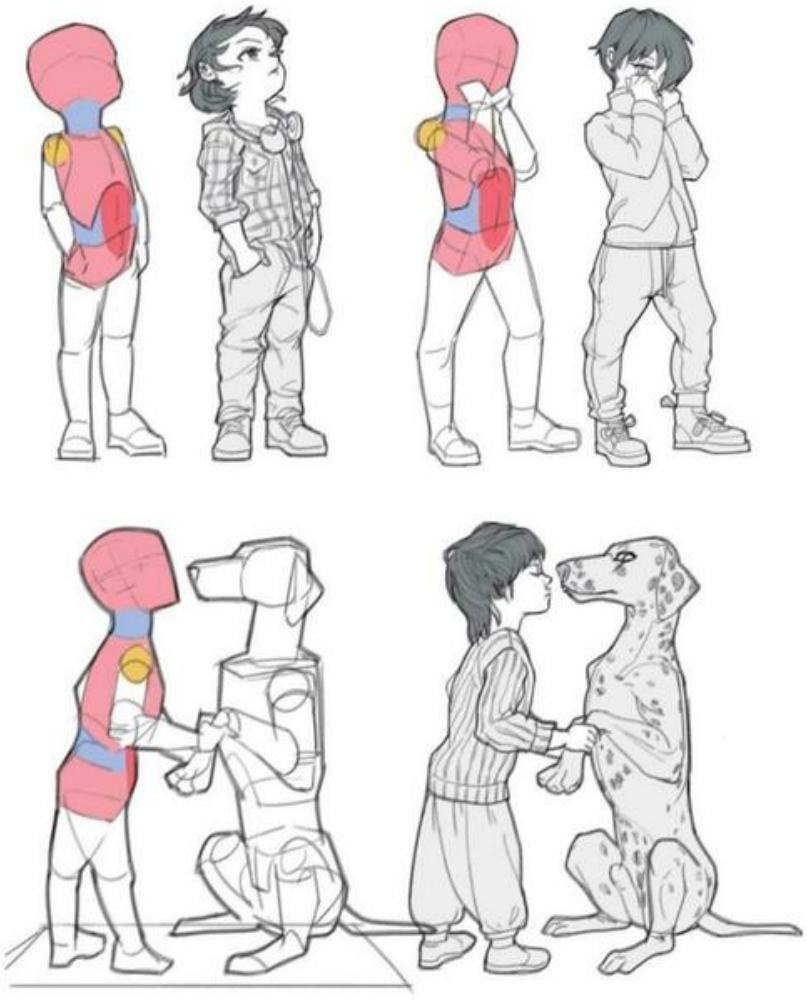


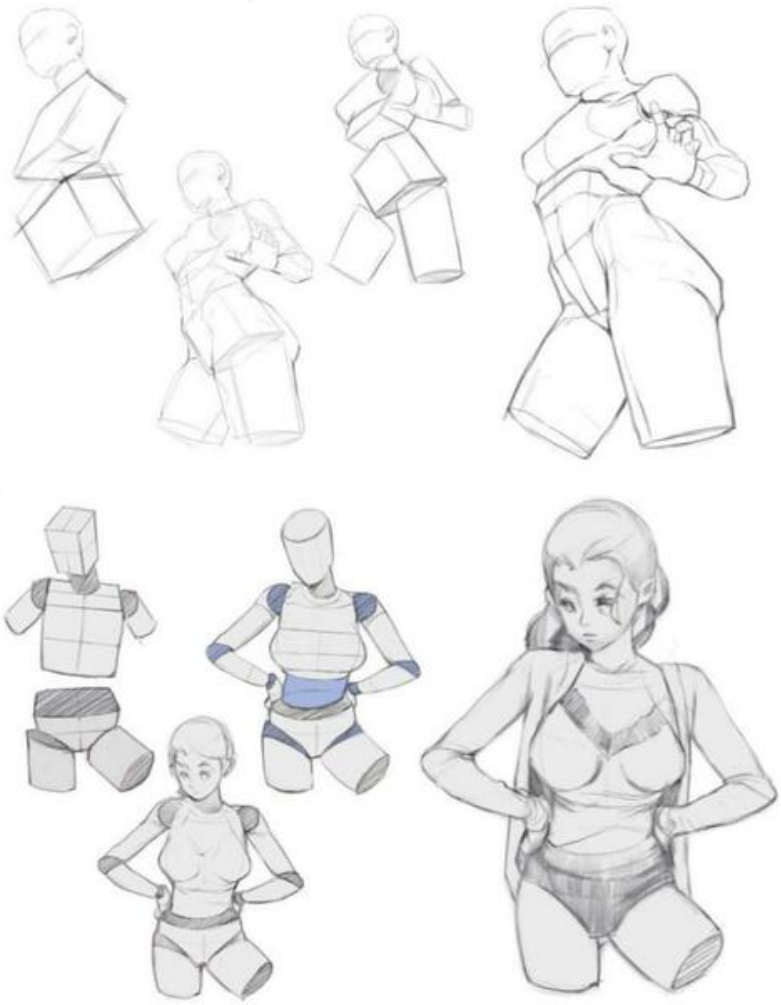
Try to refine the structure on the volume, here is how to draw the torso of a "lolita" girl.

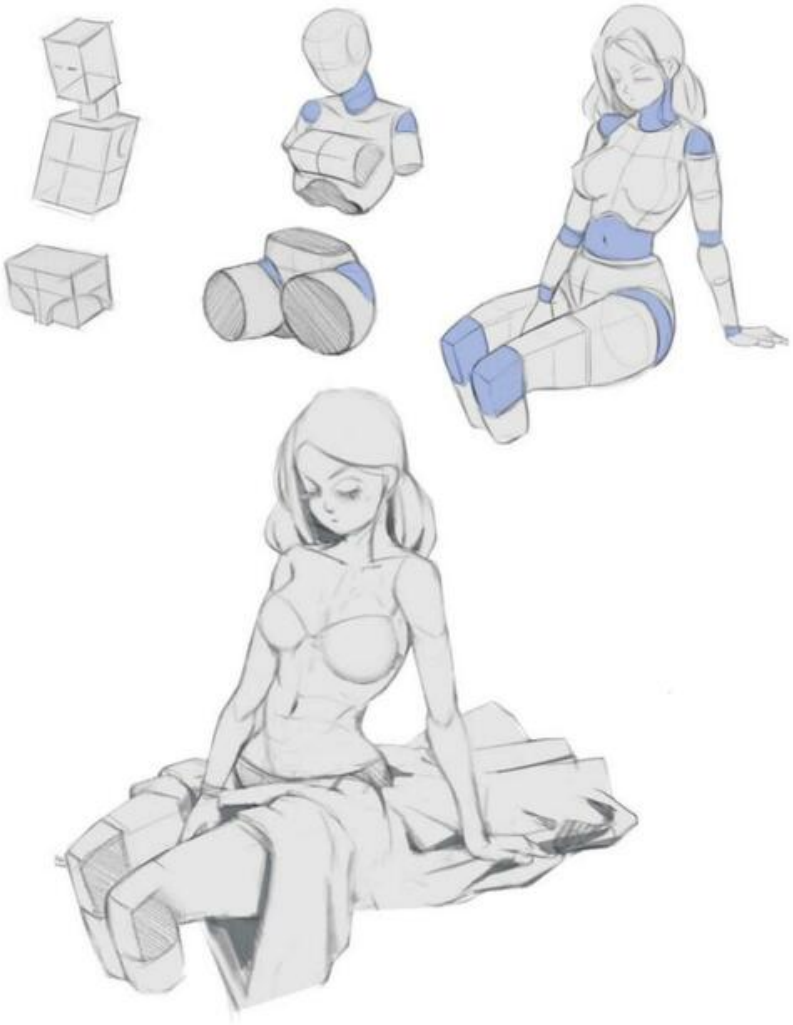




Do another set of exercises. The twisting of the torso combined with the coordinated movements of the limbs can express a more emotional character.





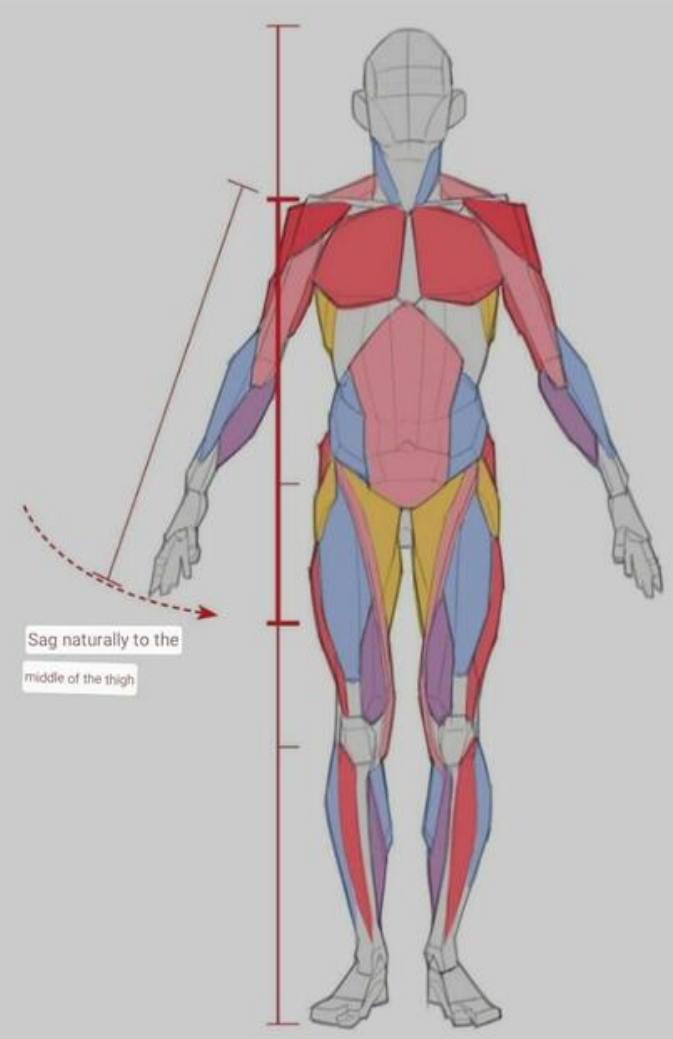


Chapter 3 Special Arm Training

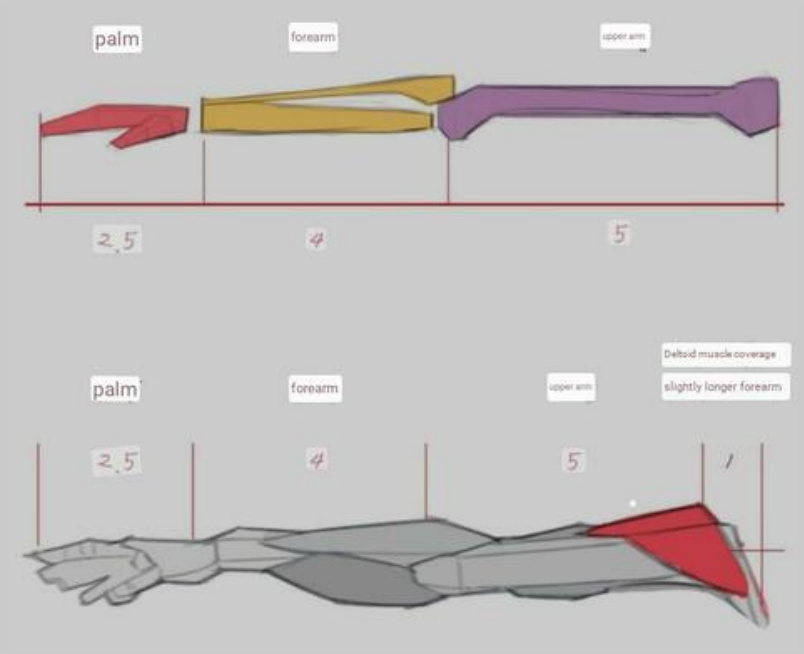
The arm is one of the difficulties in drawing. Novices often cannot figure out the regularity of its movement changes, so it is difficult to correctly draw the shape of the muscle stretching. In order to overcome the difficulty of the arm, this chapter will explain the changes in the proportions, bones and muscles of the arm, and demonstrate in detail how the arm changes during movement. When doing this kind of exercise, pay attention to be specific, clarify the purpose of the exercise and improve the efficiency of the exercise.

3.1 Proportional structure of the arm

When the arm hangs naturally, the length of the whole body is from the shoulder to the middle of the thigh between.

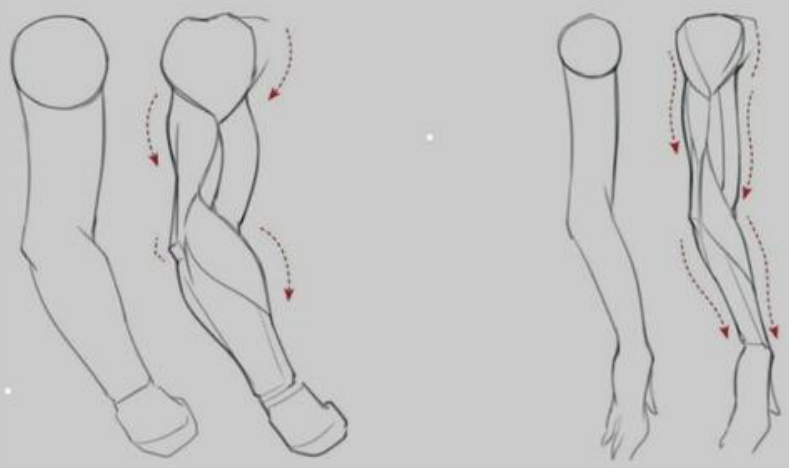


The arm can be divided into the palm, the forearm and the upper arm. The forearm is slightly shorter than the upper arm, but after adding the muscles, the upper arm after the actual deltoid is covered is longer. In order to facilitate memory, we usually think that the palm plus the forearm is approximately equal to the length of the upper arm.



In view of the difference in the proportion of male and female arms, we usually think that male arms are wider and thicker, and female arms are more slender and smooth.

When drawing, pay attention to the clearer outline of the muscles of the male arm, and the larger proportion of the joint ball; the female arm has less obvious muscle outline, the smaller proportion of the joint ball, and the muscles are covered by fat, so the overall structure details are less than that of the male arm.



3.2 The influence of arm bones and muscles on body surface

performance As an important part of the human body, the arm is often drawn when painting.

Both the skeletal and muscle structure of the body need to be understood. Only by understanding the bones and muscles of the arm can

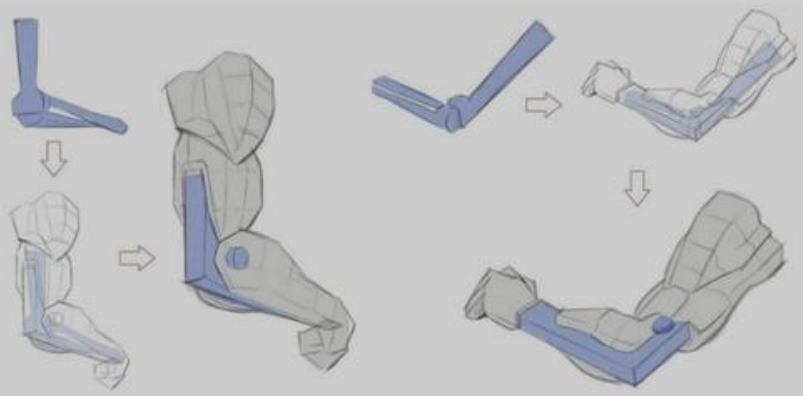
Better representation of the shape and outline of the arm.

Before explaining the influence of bones and muscles on body surface performance in detail, let's briefly introduce the

relationship between the bones and muscles of the arm.

Most of the bones of the arm are wrapped in muscles, and the shape is only obvious when the elbow

joint is bent, as shown in the figure below.

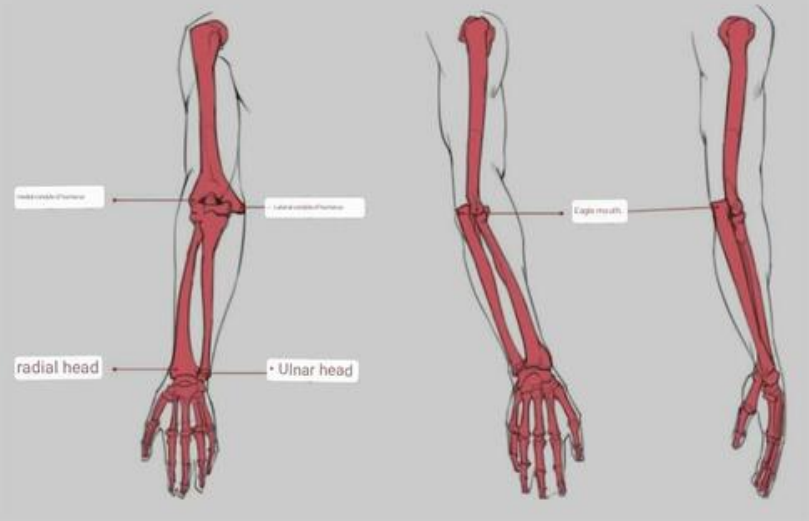


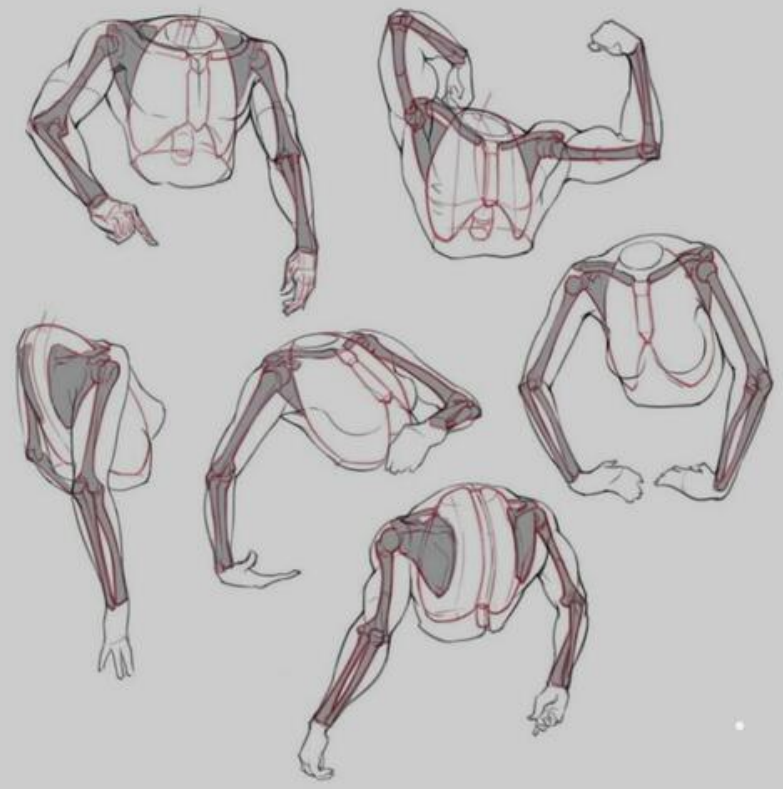
3.2.1 Influence of arm bones on body surface performance

The bones of the arm act as a scaffold and affect the appearance of parts of the arm, with particular attention to the parts of the bones

that are not enclosed by muscle, such as the medial condyle of the humerus, lateral condyle of the humerus, the radial head, the ulnar head

and the olecranon.


radial head
• Ulnar head
Eagle mouth



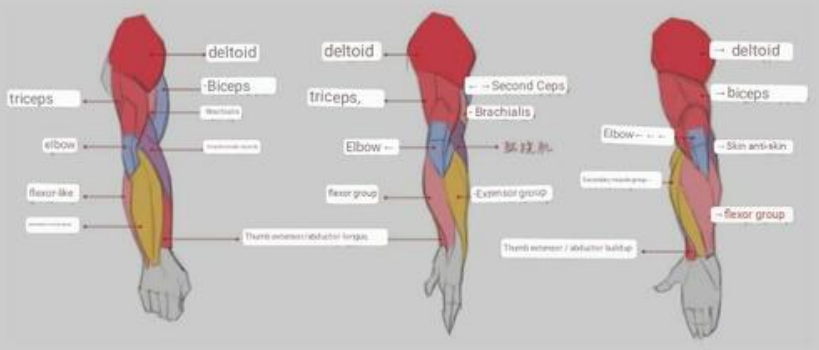
hint

When showing the back of the arm, the medial condyle of the humerus, the lateral condyle of the humerus and the olecranon should be shown, especially

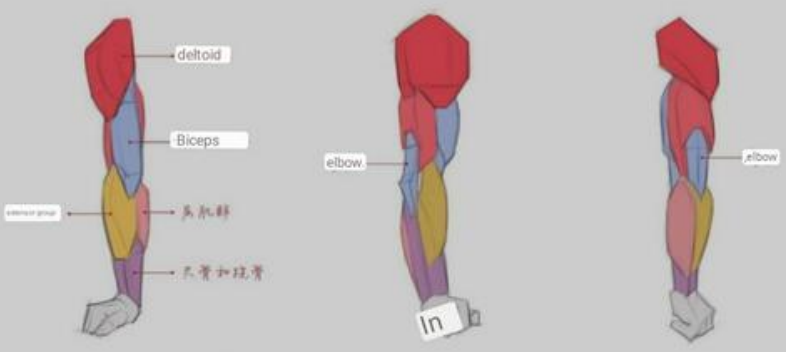
These bone points are more pronounced when the arm is bent.

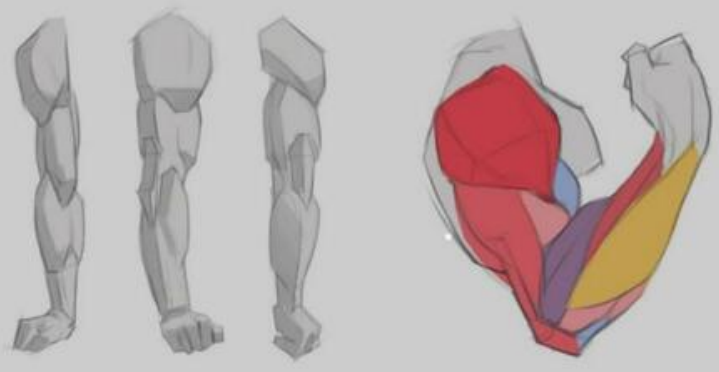
3.2.2 Influence of arm muscles on body surface performance

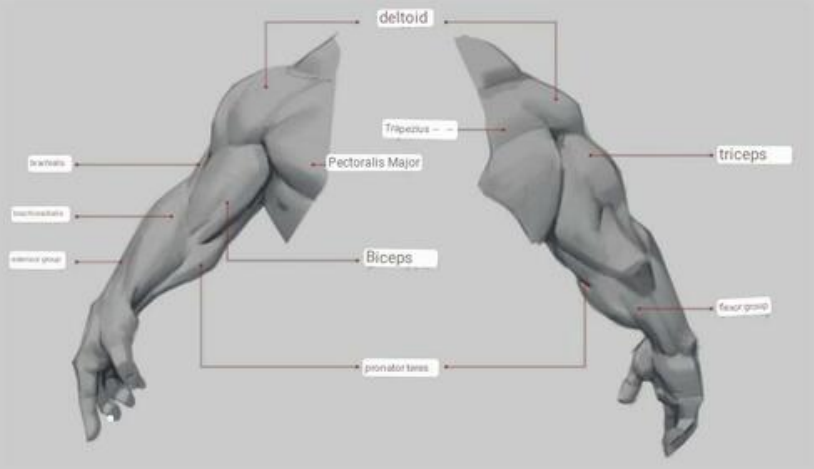
Here we simplify complex muscles into several large muscle groups for the convenience of beginners untie.



Next, we summarize these muscle groups into a relatively simple and easy-to-remember shape.







After understanding the basic influence of arm muscles on body surface performance, let's look at three aspects

Let's introduce the impact of the movement of each muscle group on the shape of the arm..

• Influence of deltoid surface performance

The deltoid is an important muscle in the arm. Originating from the lateral 1/3 of the clavicle, acromion, scapula,

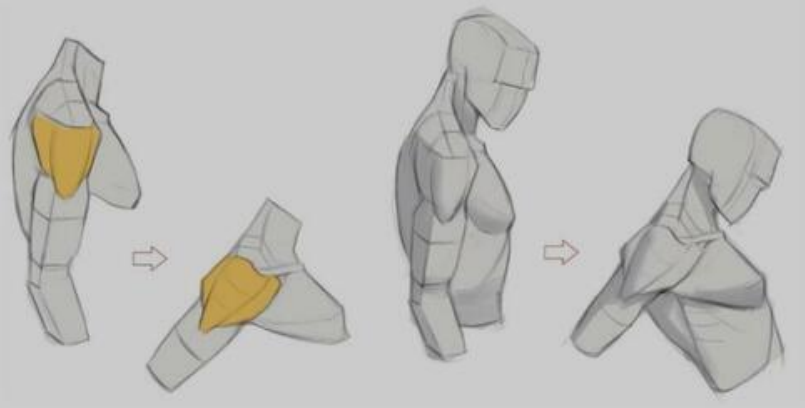
Inserts near the middle or 2/5 of the lateral side of the humerus.

Function: Abduction, flexion, and extension of the shoulder joint. Here we imagine the deltoid muscle as a shoulder pad, which just protects the end parts of the upper muscles and plays an effective protective role. The deltoid is primarily wrapped around the arm and changes as the arm moves and rotates. Looking at the muscle dynamics, we found that when the arm is raised upward, the anterior and middle deltoid muscles are drawn in

When the rear deltoid muscle is stretched, it lengthens vertically and becomes wider laterally.

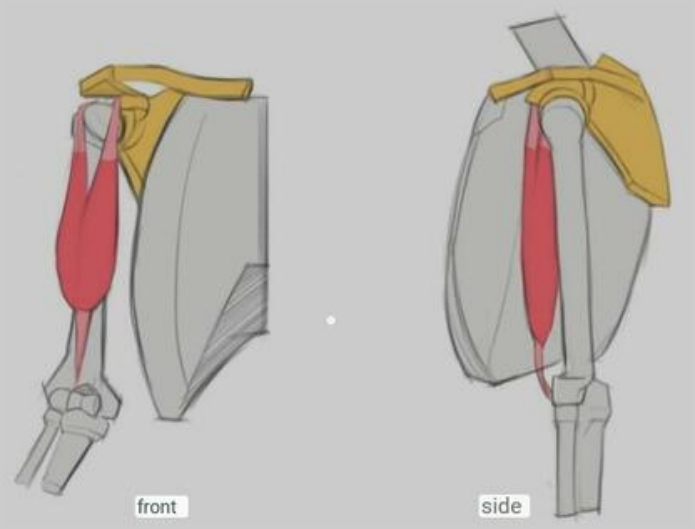
narrow.

When the arm is stretched back, the posterior deltoid contracts and the front and middle stretches. The dynamic changes of the deltoid are as follows.



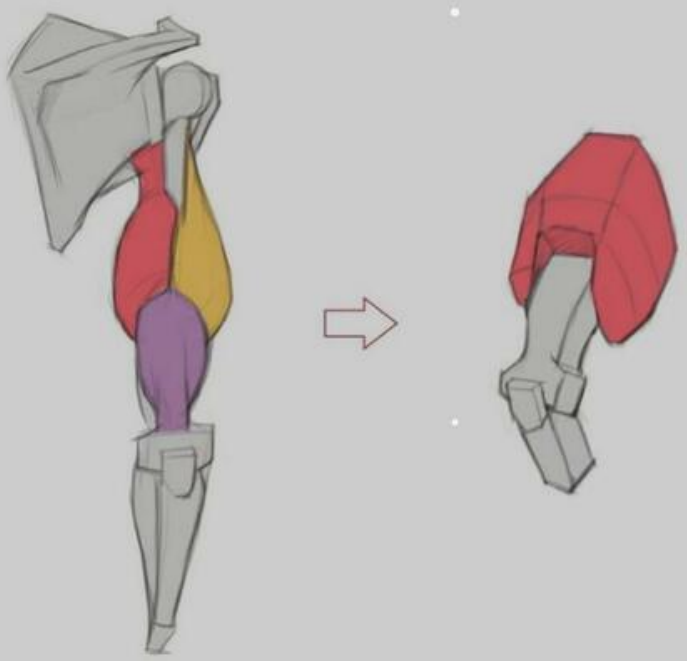
The effect of biceps and triceps on body performance

Biceps brachii; it is fusiform in front of the upper arm, and has two heads, long and short. It descends to the tendon and aponeurosis, and inserts into the radial tuberosity and the interosseous membrane of the forearm.

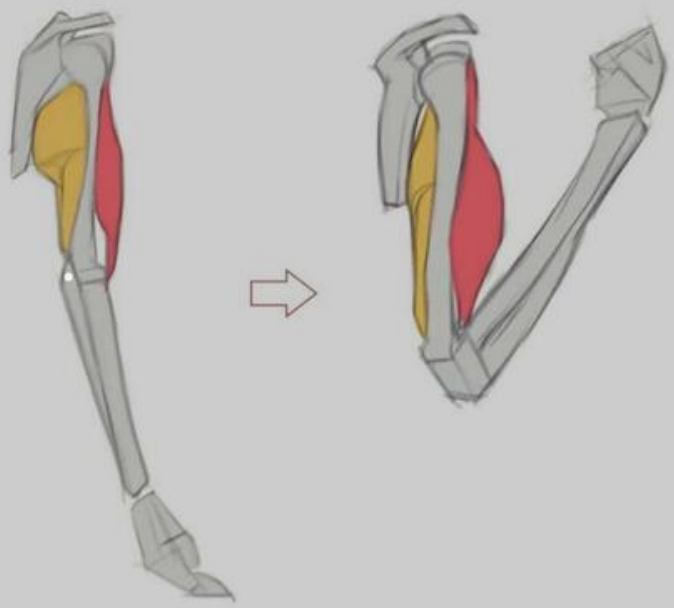


Triceps brachii: on the back of the upper arm, the origin has three heads: long, internal and external, the long head originates from the submenglia tubercle of the scapula, the lateral head originates from the part above the radial nerve groove on the back of the humerus, and the medial head originates from the radial nerve groove In the following part, the three heads form a muscle belly, which is inserted into the olecranon of the ulna by a common tendon.

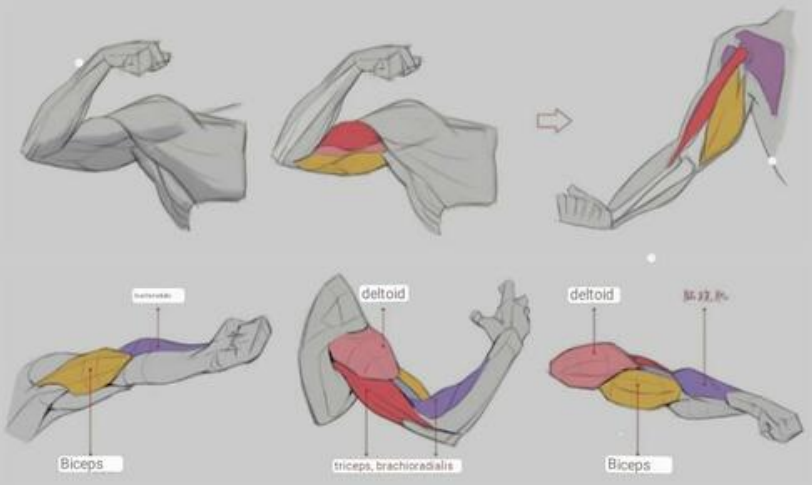
A simplified anatomy of the muscle structure is shown below.



The movement and changing relationship of the upper arm are shown as follows.



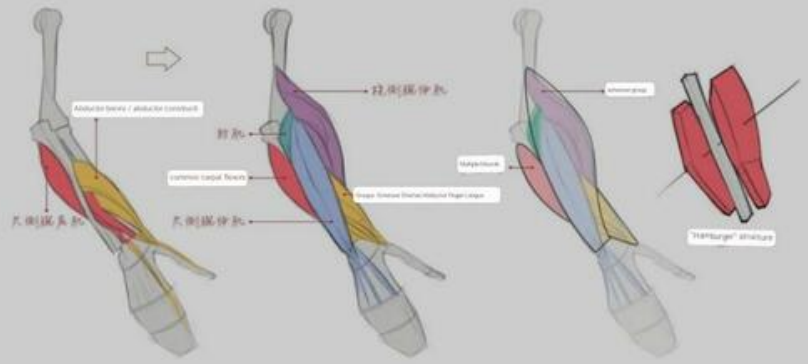
The relationship between the movements of the biceps and triceps is shown below.



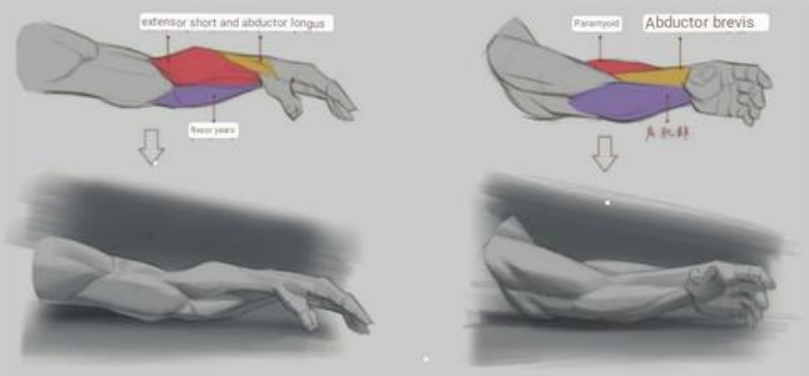
The dynamic relationship between the triceps and the olecranon is as follows.

Influence of forearm muscle groups on body surface performance

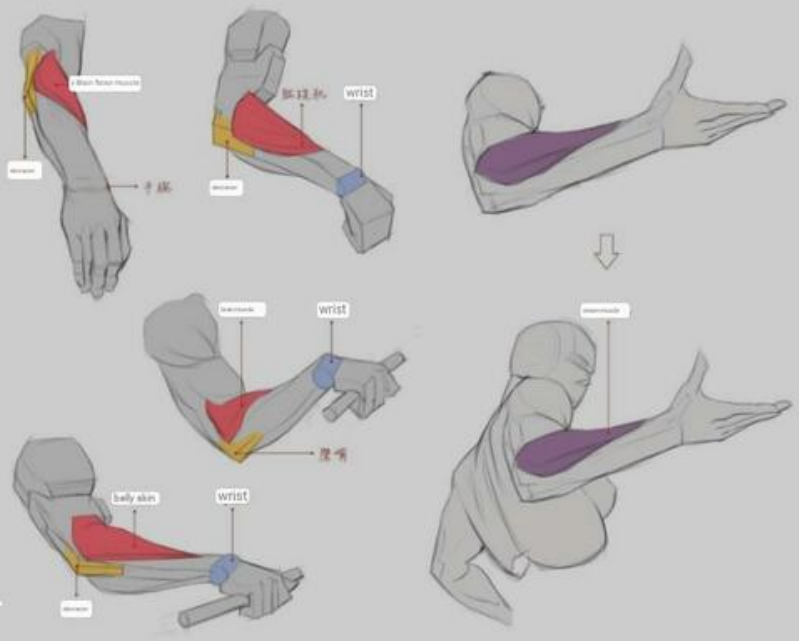
The forearm muscles are arranged in multiple layers, and the interspersed relationship is very complex. Forearm muscles including the ulnar wrist Flexor, elbow, extensor carpi ulnaris, extensor carpi radialis, extensor pollicis brevis and abductor pollicis longus, etc. In order to facilitate memory, the forearm muscles can be summarized into two major groups, namely, extensors and flexors. The extensors cover the back of the hand, and the flexors cover the palms, which are wrapped on both sides of the ulna and radius like a hamburger.



The extensor and flexor groups at other angles are as follows.

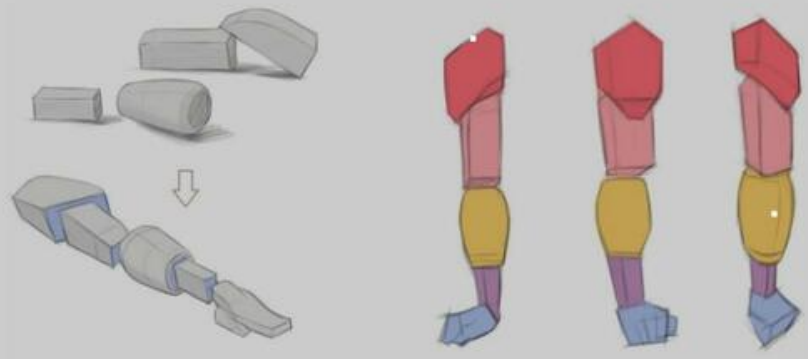


The brachioradialis muscle connects the hind arm and the forearm, and is very important in the performance of the arm surface. When drawing the arm that does the action, pay attention to the position and shape of the starting point of the brachioradialis muscle.

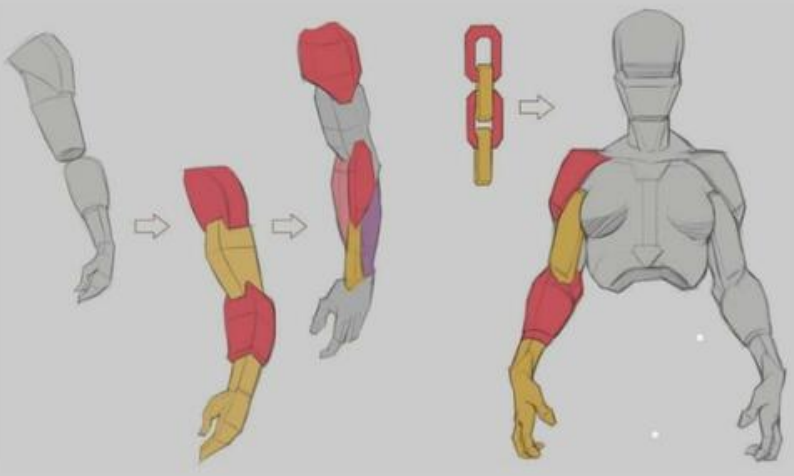


3.3 The connection between the arm, the torso and the hand

The arm is one of the important parts of the human body, and it is also the focus of painting the human body. However, in the actual painting process, many newcomers often can only draw a simple cylinder to represent the arm structure, resulting in a rigid and unnatural arm structure, or an unnatural connection between the arm and the ribcage. painting Before making the arm structure, we must first understand the connection between the arm and the torso and the hand. Below, we first simplify the complex arm structure into a cylinder (forearm), two cuboids (upper arm and wrist), and a polygon (deltoid region).

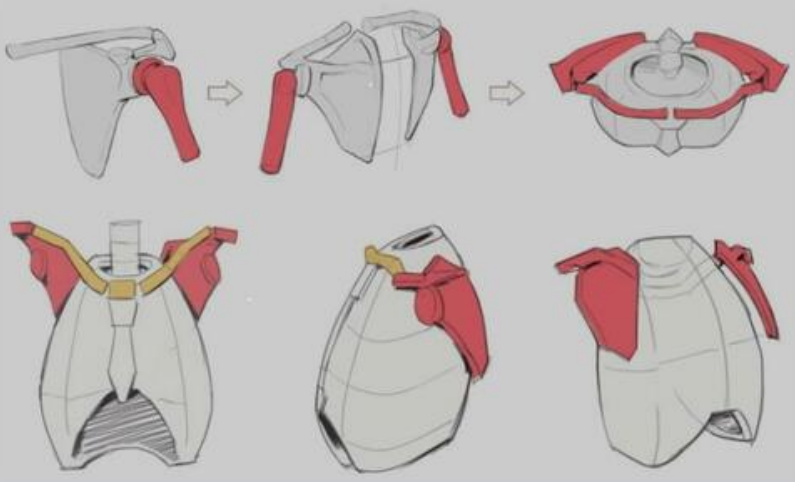


We can imagine the connection between the arm and other parts as a chain structure, as shown below shown.



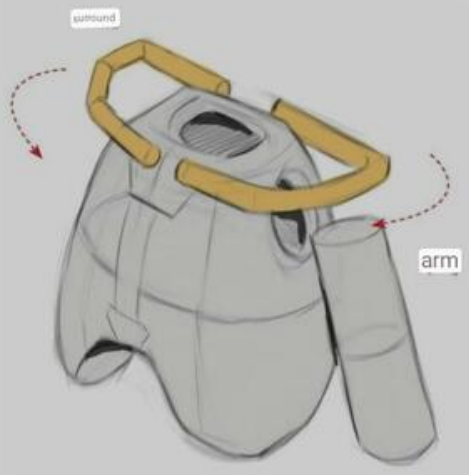
3.3.1 Articulation of the arm to the scapula and clavicle

Before drawing the arm, it is important to understand how the arm is connected to the scapula and clavicle. The humerus grows where the scapula meets the clavicle and rotates freely in the groove on the outside of the scapula.

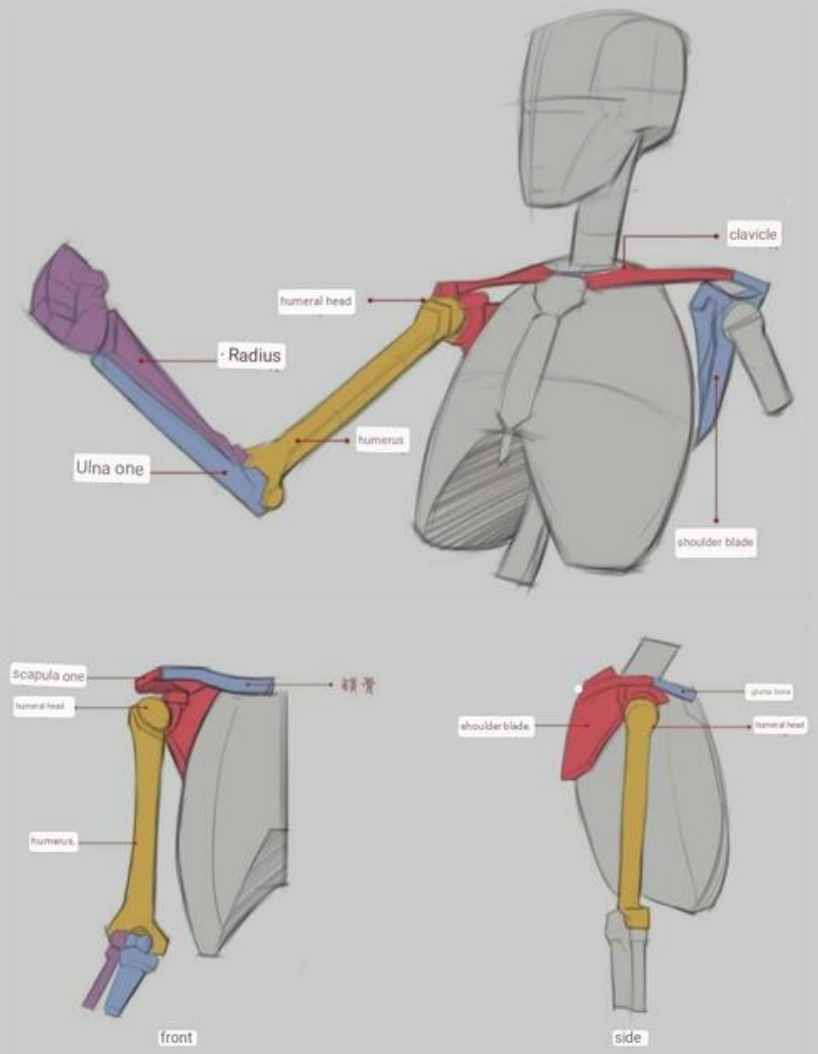


|Tips

The scapula can move in a small range and is not immovable on the ribcage. The ring formed by the collarbone and scapula acts like a clip around the ribcage.



The anatomy of the arm bone structure is shown below.



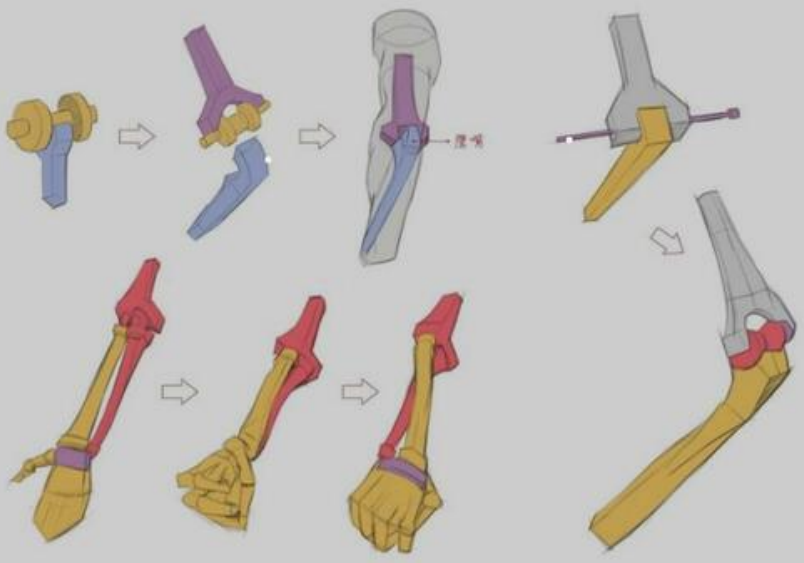
3.3.2 Articulation and movement of the forearm

Before analyzing the articulation and motion of the forearm, let's take a look at the ulna and radius.

The ulna is located on the medial side of the forearm, and the entire length from the olecranon to the styloid process is located under the skin behind the medial side of the forearm. Among them, the olecranon is more obvious when the elbow is flexed; the styloid process is more obvious when the forearm is pronated, and it can be felt below the ulnar head. Look at the back of your wrist

The ulnar head at the transverse crease of the wrist will be very obvious.

The radius is located on the lateral side of the forearm, and the highest point on the upper border of the radial capitulum at the upper end is the radial point, which is a body surface marker for measuring the length of the upper arm and the forearm. The radial point is located in a small depression on the outside of the back of the elbow joint when the upper extremity is drooping and the palm is inward. In this depression, the humeroradial joint can be easily found, and the radial point can also be determined. The lower end of the styloid process is easily palpated subcutaneously on the lateral side, which is more obvious when the wrist is flexed. This point is the radial styloid process point, which is a body surface marker for measuring forearm length and a body surface marker for measuring hand length. The structural changes of the ulna and radius during torsional motion are shown in the figure below.

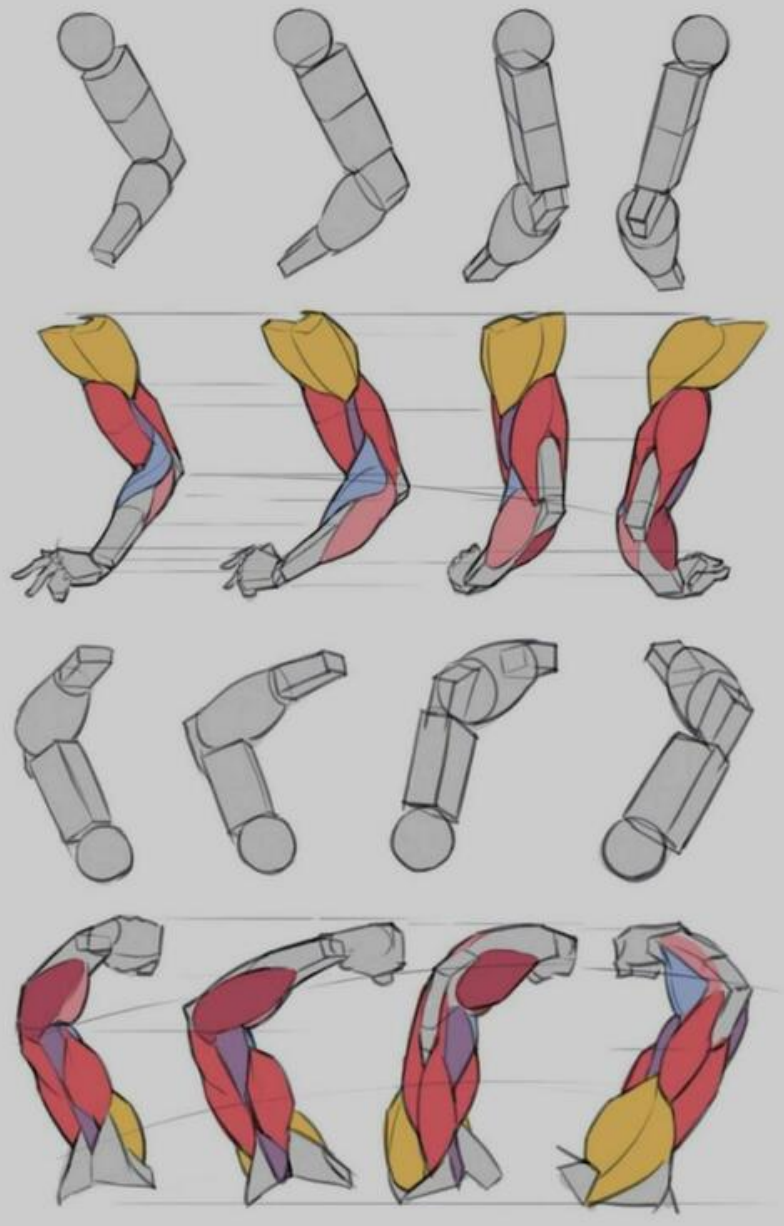


3.4 Arm twist and dynamic performance

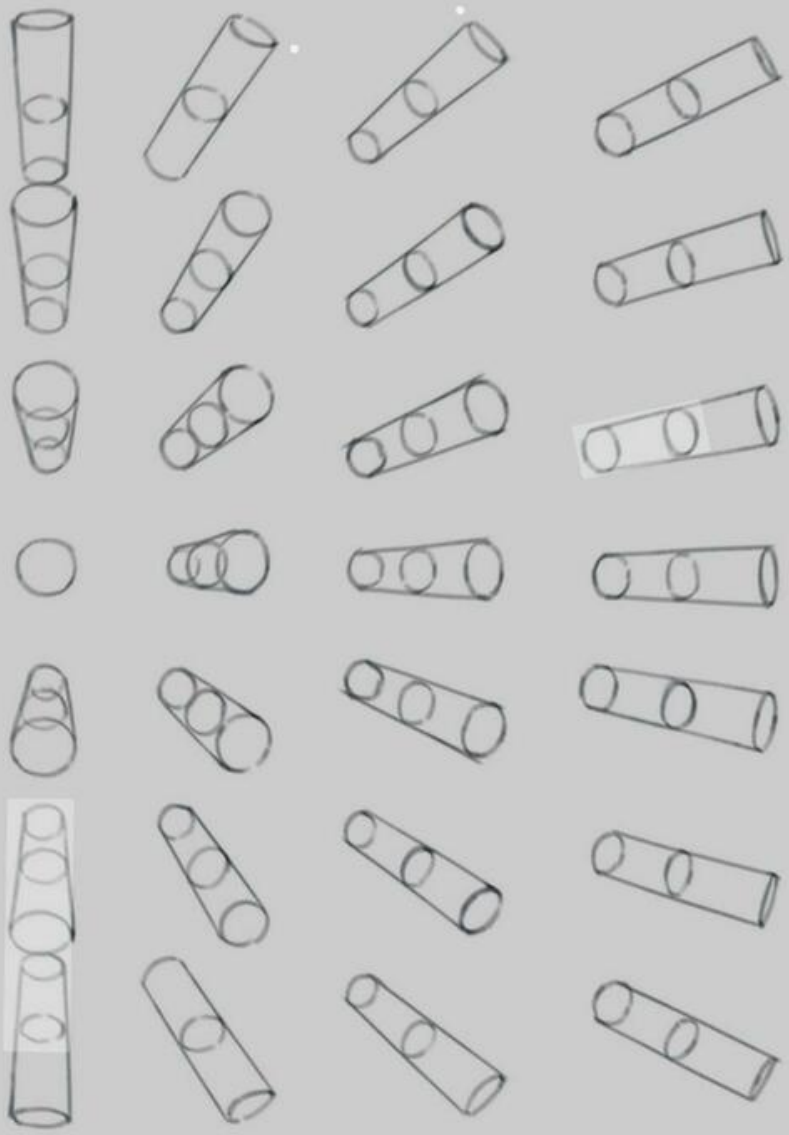
After understanding the bone and muscle structure of the arm, we still need to do some research on the changes of the arm muscle structure and stretching under different torsion states.

3.4.1 Basic twist of the arm

The arm can be regarded as a cylinder, the proportional perspective change of the cylinder can be grasped, and the arm structure to be drawn can be added to the interior of the cylinder to restore the arm shape at various angles. First outline the geometry of the arm, and then add the muscle blocks.

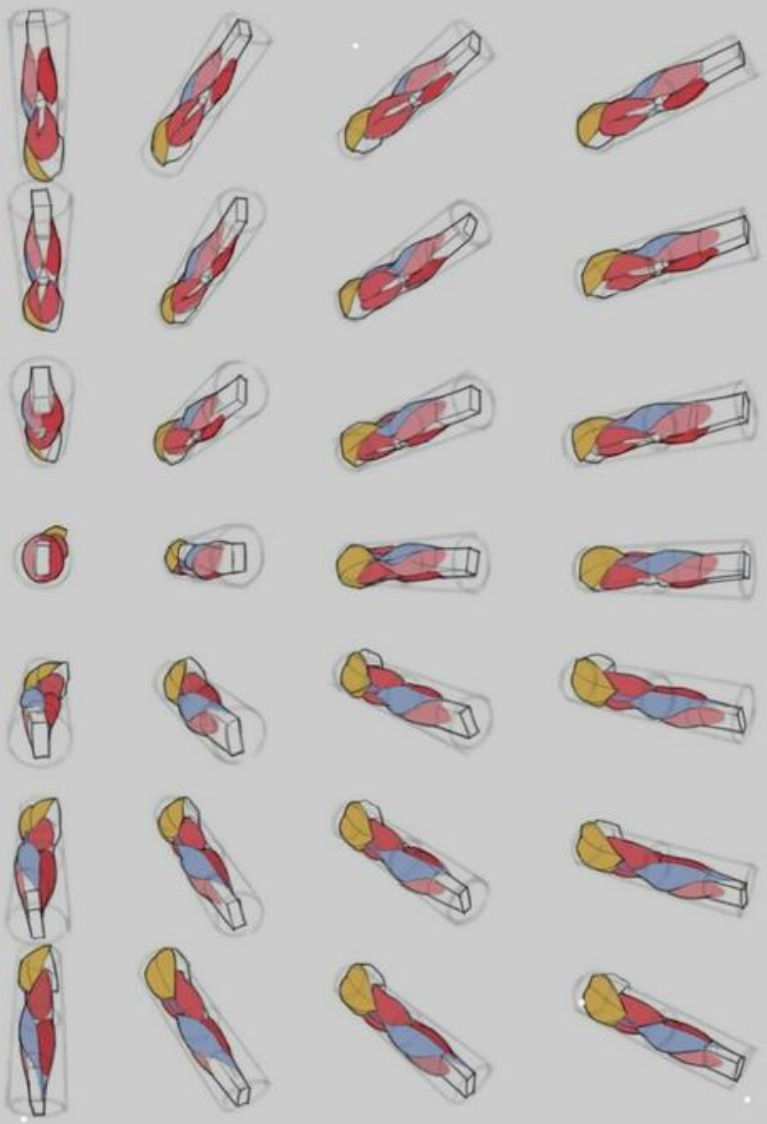


According to the perspective law of the cylinder, the arm perspective of different angles can be drawn as shown below visual form.

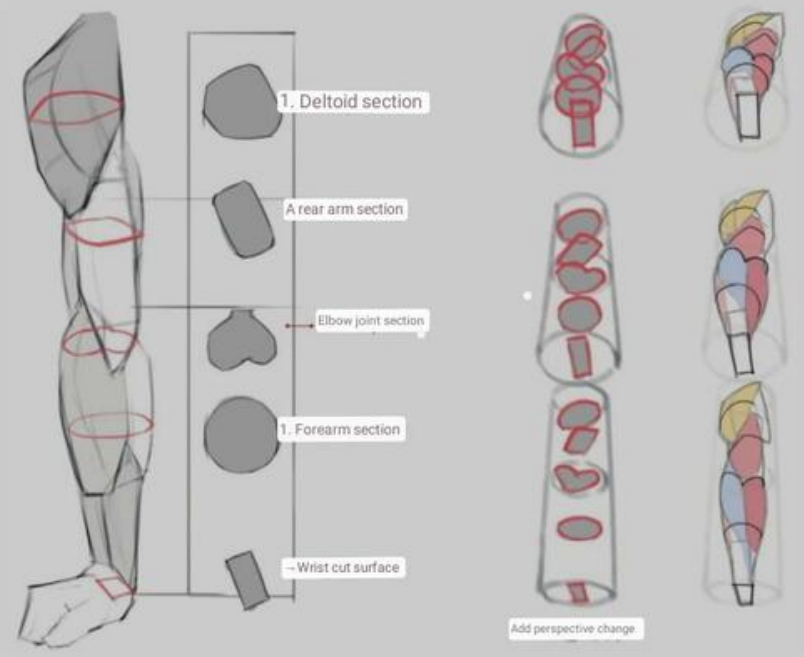


After mastering the above knowledge points, then draw the arm, no matter which angle it is, you can

Draw with ease.



When adding muscles on the basis of cylindrical perspective, attention should be paid to the occlusion relationship between muscle blocks. The occlusion relationship of different muscle blocks can be determined by memorizing the spatial position relationship of key sections.



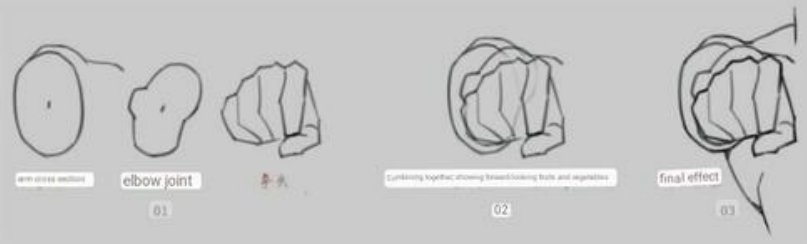
At the same time, when we are proficient with the methods mentioned above, as long as we draw the key sections, we can calculate the arm structure in perspective. Let's demonstrate how to draw an arm that punches forward.

01 Draw a cross section of the arm, a cross section of the elbow joint and a fist.

02's.

Arrange the two transverse planes and fists in front and back, which is manifested as the occlusion of the near distance and the far distance.

03 Erase the invisible part after occlusion.

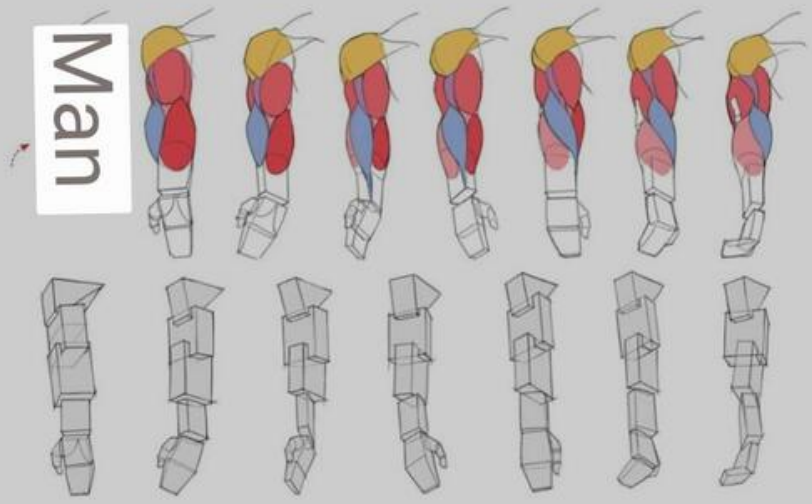


3.4.2 Dynamic performance of the arm

The dynamics of the arm mainly include wrist rotation, elbow bending and arm lift rotation, etc. During the arm movement, the muscles will be stretched and deformed.

●Wrist rotation

The rotation of the wrist will affect the shape of the stretched muscles. Generally, the muscles of the upper arm do not change much, while the muscles of the forearm will change with the rotation of the wrist. Let's do a set of examples of clockwise rotation of the wrist.

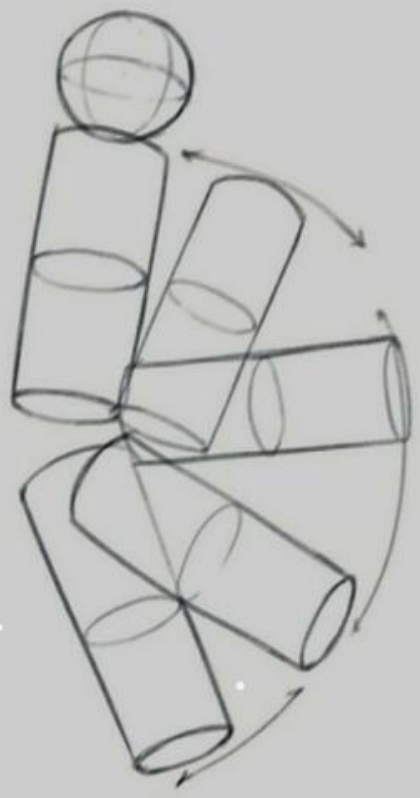


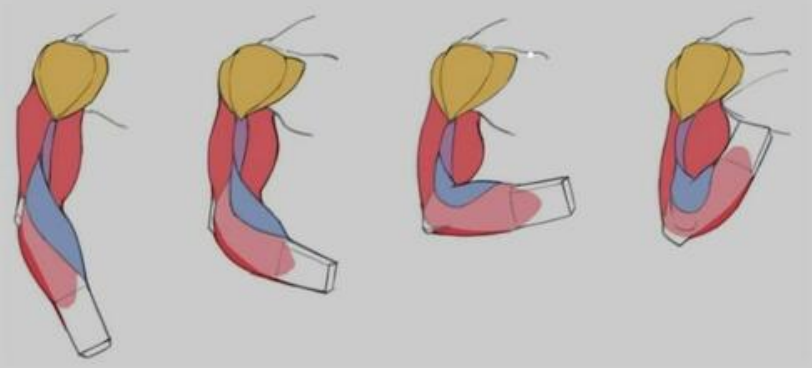
hint

As you draw, pay attention to the changes in rotation where the arm muscles connect to the wrist.

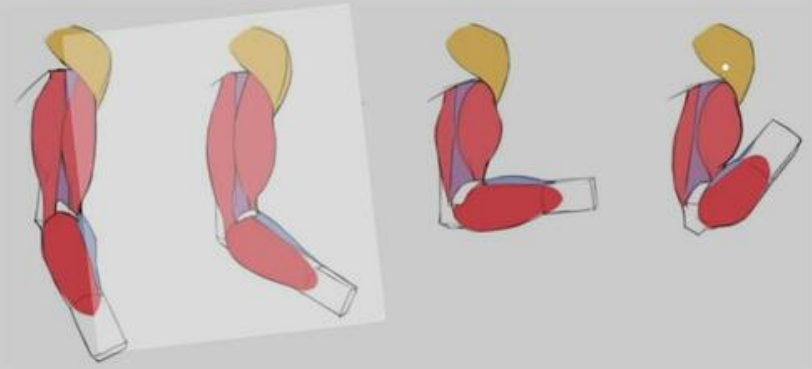
• elbows bent

When the elbow is bent, the forearm and wrist will rise along the arc, and the wrist will not be attached to the upper arm due to the influence of muscle compression. As you draw, pay attention to the changes in the contraction of the biceps and triceps.





Elbow Bend Outside Demonstration



Inside Elbow Bend Demonstration

· Lift arm rotation

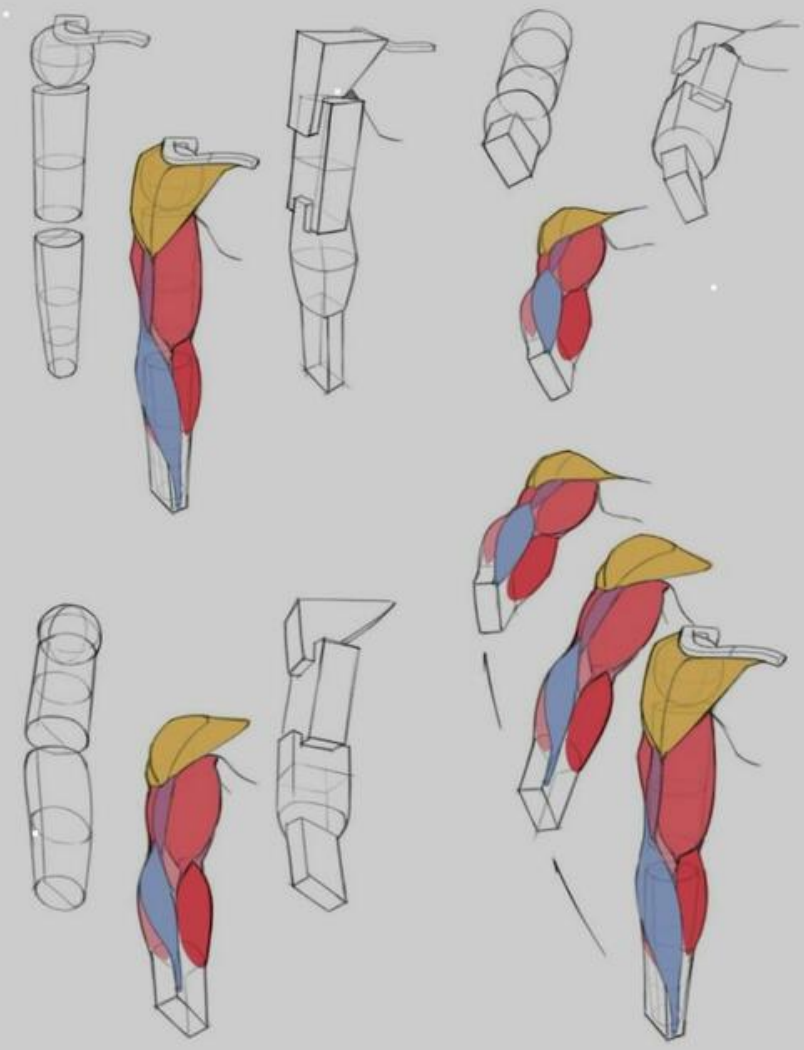
The position of the deltoid muscle changes as the arm lifts up, turning from the side to the back.

side

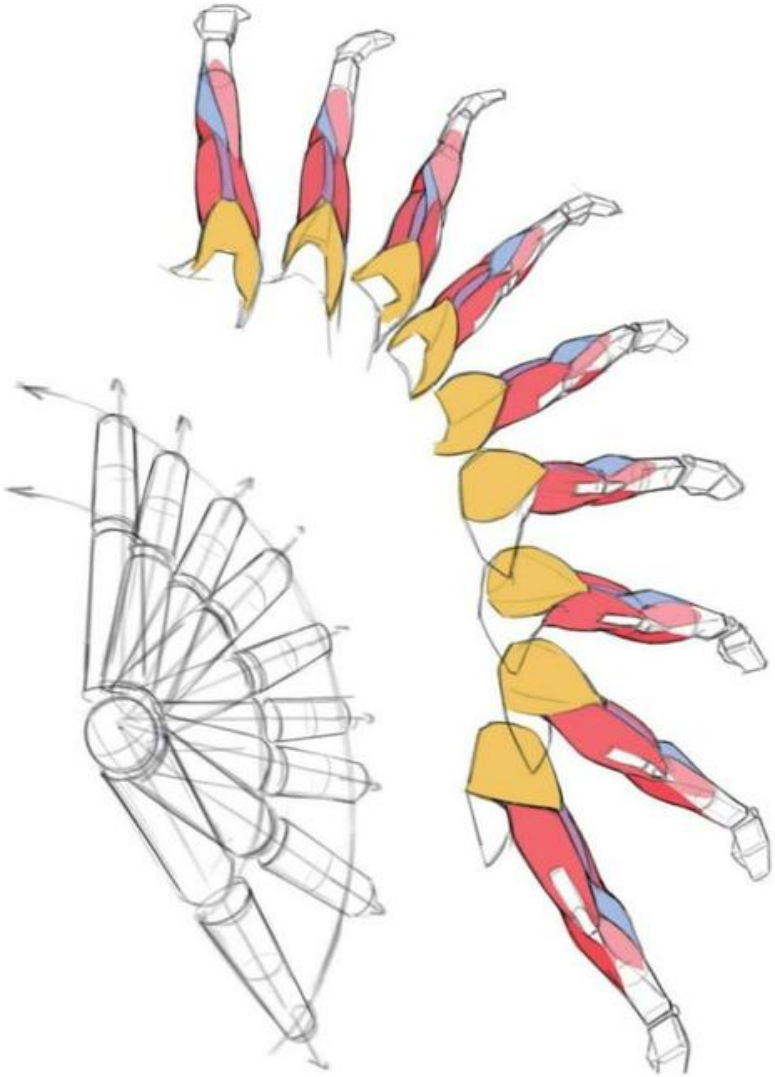
oblique side

Behind

When drawing the arm lift, attention should be paid to the changes in the shape of the muscles at the connection points during perspective compression and lift, such as changes in the deltoid and pectoralis major, and linkage thinking should be required when drawing.

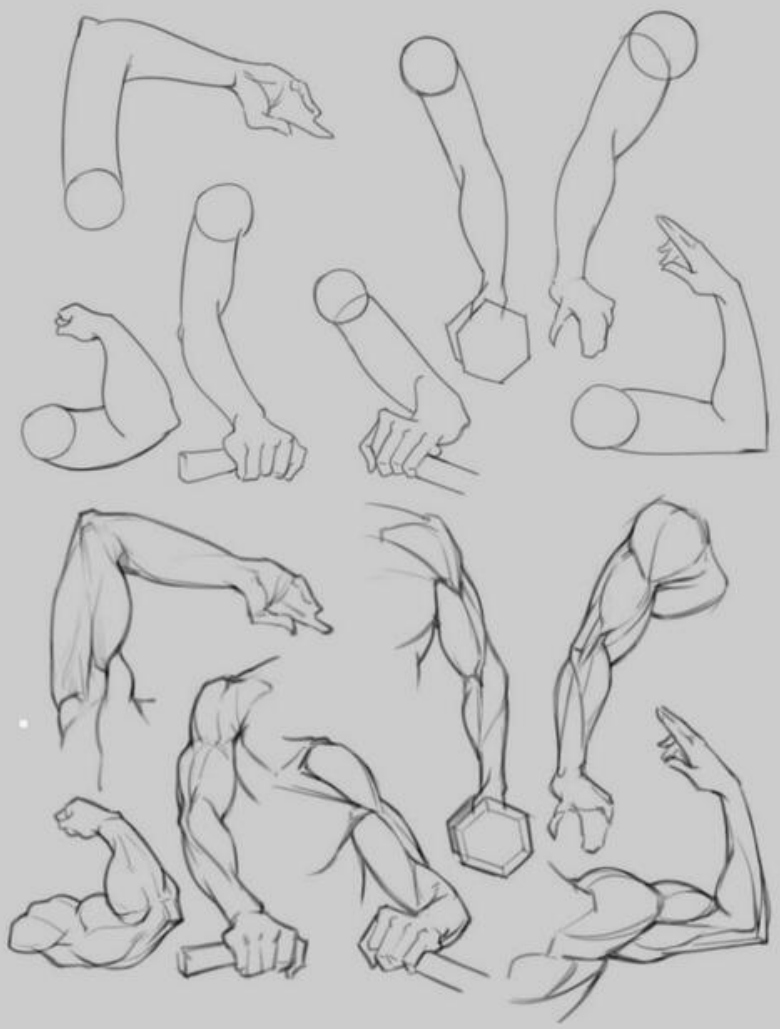


The arm rotates slightly when the arm is raised sideways.

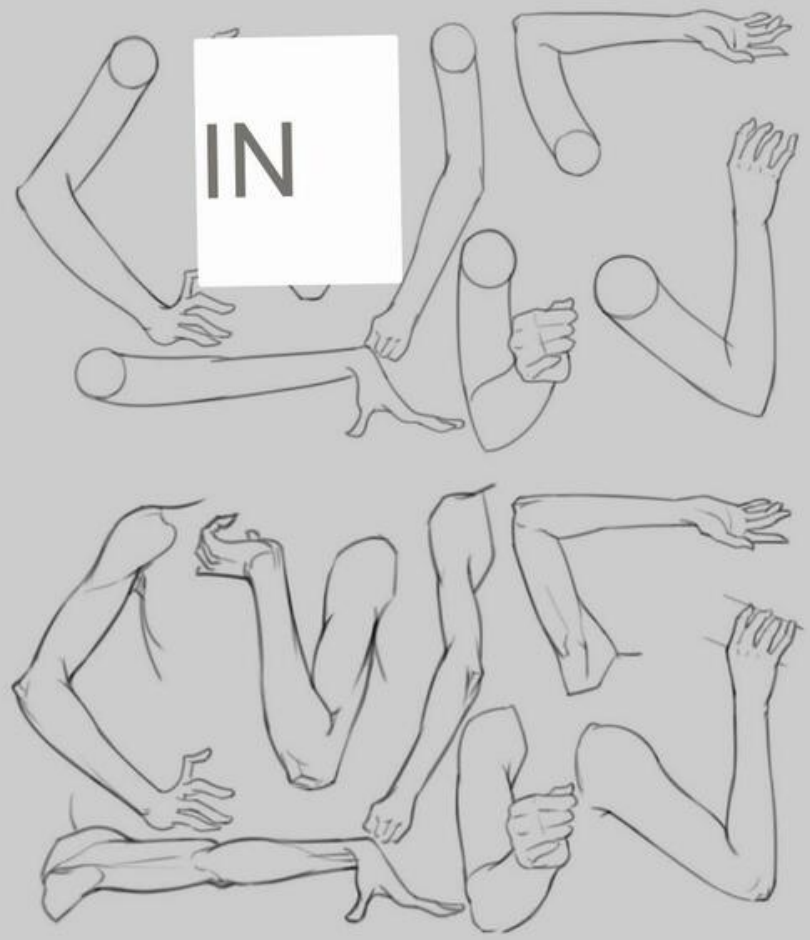


More special training

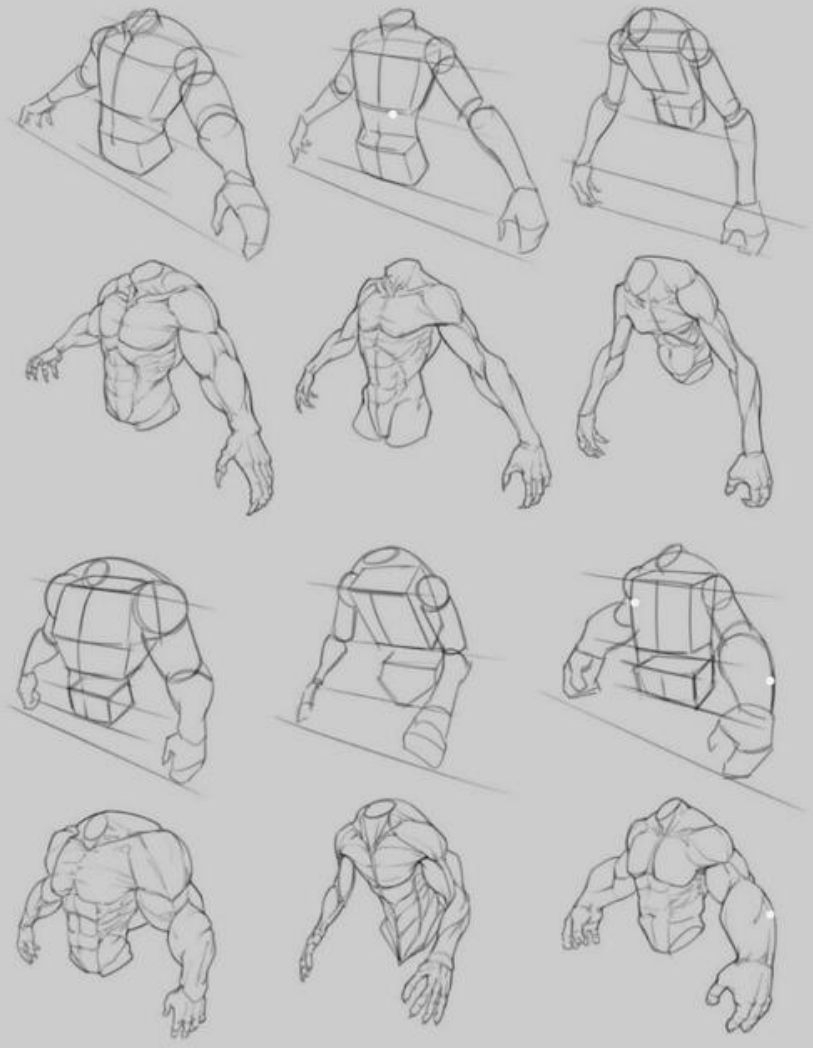
Do a set of male arm structure plus muscle exercises.



Do a set of female arm structure plus muscle exercises.



Do a set of movement exercises in which the male arms connect to the torso.



Do a set of rotation exercises for arm deformation.

THEM

Chapter 4 Special Leg Training

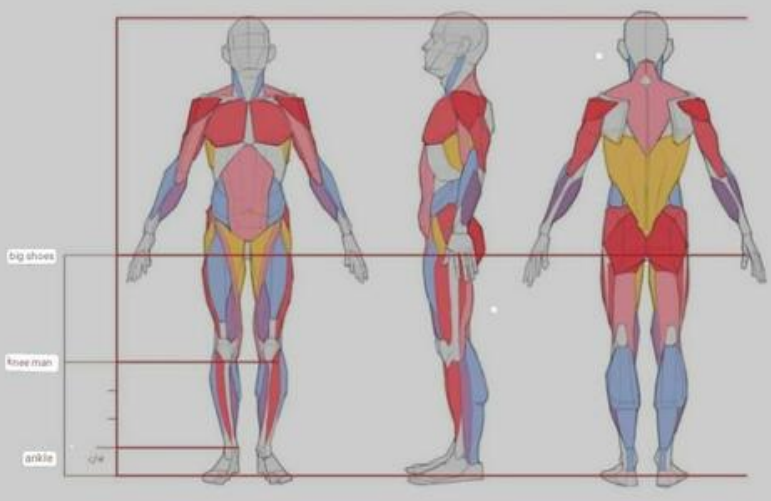
with Affecting the beauty of the entire human body shape, many beautiful postures need to be presented the performance of the legs. This chapter will focus on the proportions of the legs, the connections between bones and muscles and the legs.

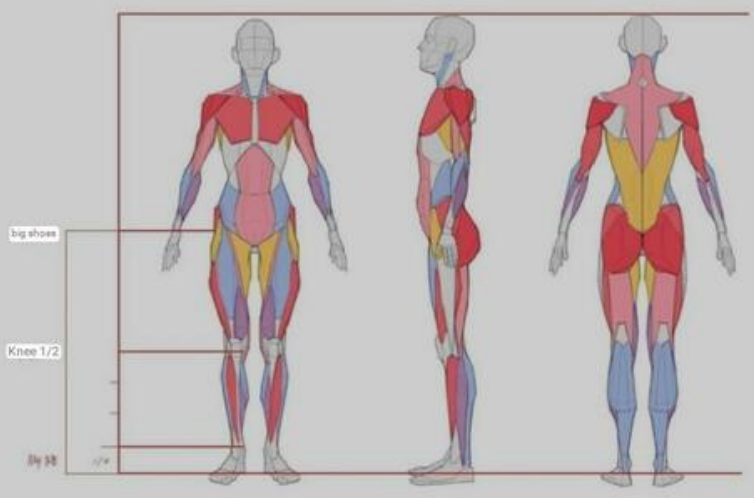
4.1 Proportional structure of the legs

The leg takes the greater trochanter of the femur as the dividing line, which divides the upper body and lower body of the human body equally. Generally speaking,

the lower body of women is slightly longer than that of men. The distance from the greater trochanter to the bottom of the knee is equal to the distance from the bottom of the knee to

the bottom of the foot, and the height from the ankle to the bottom of the foot is about 1/4 of the height from the knee to the bottom of the foot.



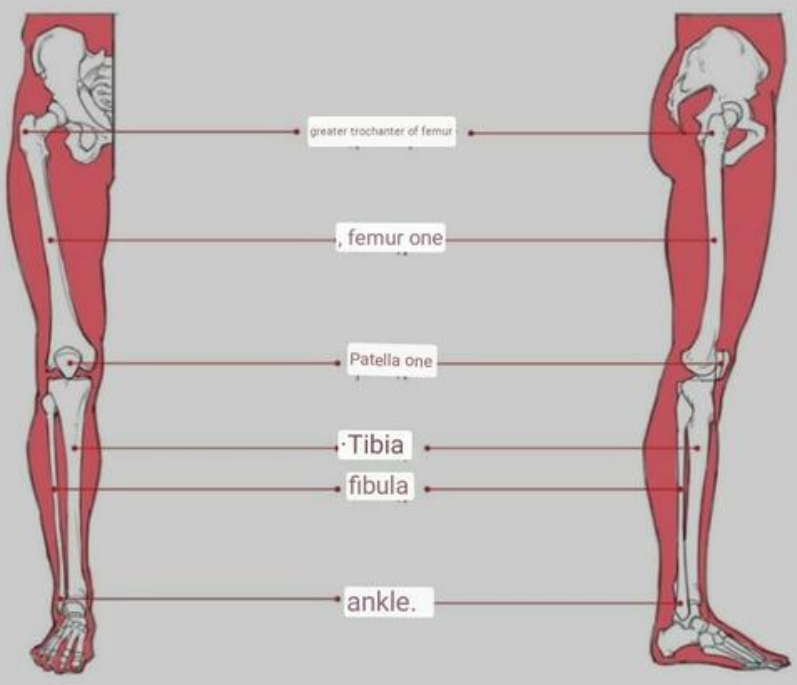


4.2 Influence of leg bones and muscles on body performance

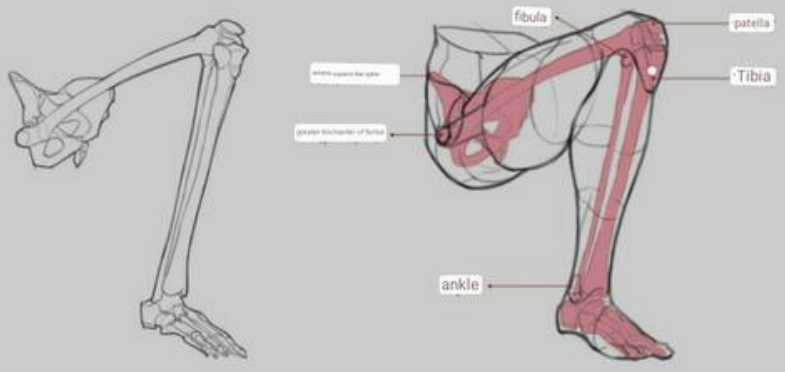
We often see that the outlines of people's thighs in excellent paintings will have some very subtle curves. The lines change, and the shape is very soft and vivid, but when I go to sketch myself, I always fail to draw it well. When we observe the character works drawn by some excellent painters, we will find that some structures they draw are difficult to appear in reality, and newbies will feel that the structures they draw are not the same as the structures they draw. The reason for this is that they have a better understanding of the structure of leg muscles and joints, and in the process of painting, some structures will be appropriately exaggerated and deformed according to the dynamics of the body. The following will summarize the complex muscles into simple shapes, making it easier for you to remember some important structures of the leg and understand the impact of these structures on the shape of the leg.

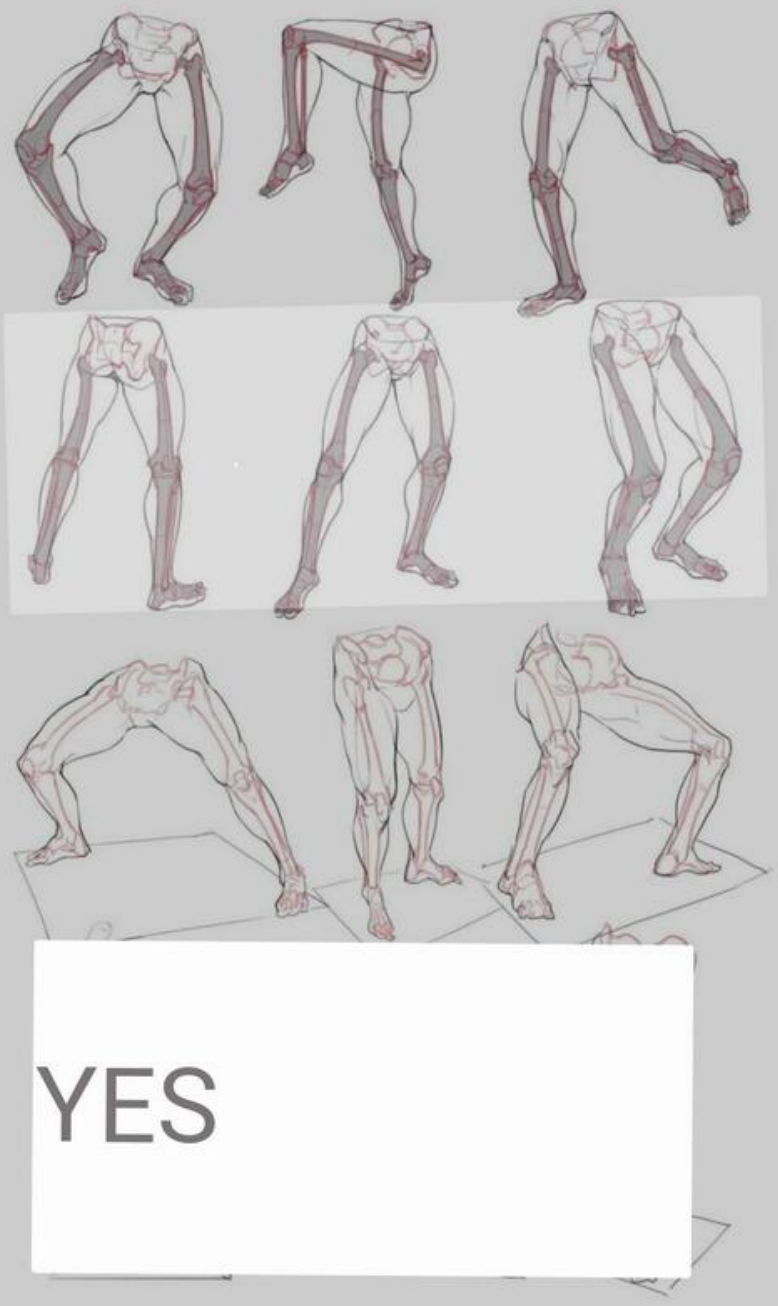
4.2.1 Influence of leg bones on body surface performance

The leg bone is the support of the leg, and it is more convenient to add muscles by drawing the support.



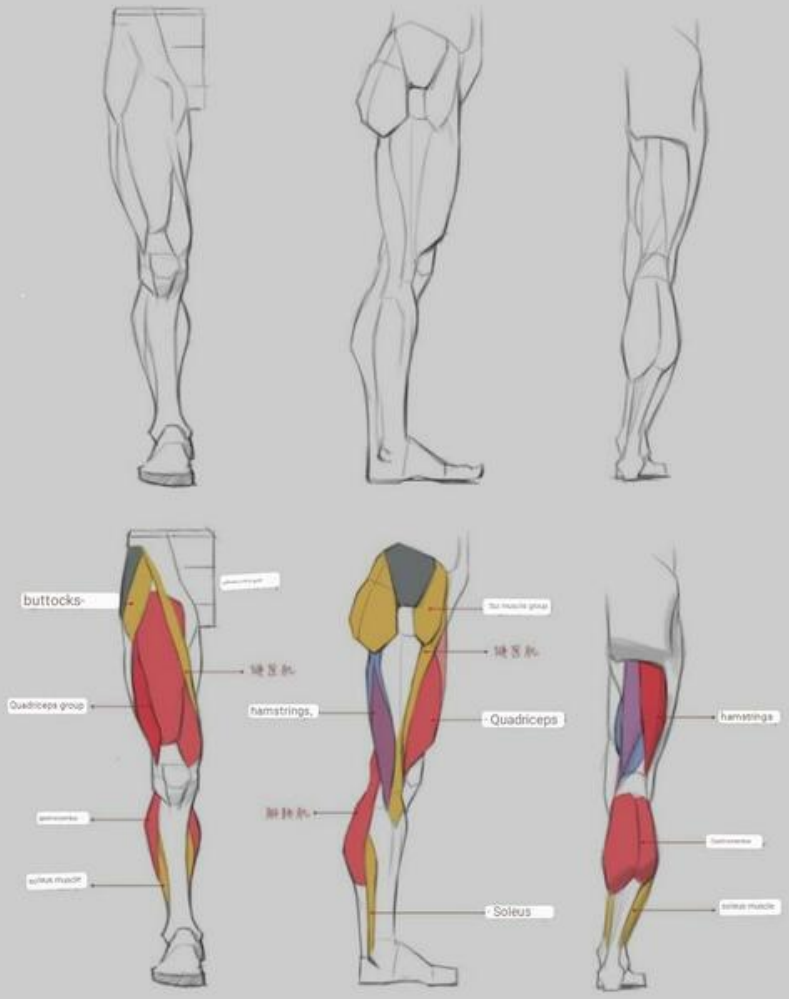
Special care should be taken when drawing the parts where the bone is exposed, these points are not enclosed by the muscles and are therefore very identifying. The shape of the memory thigh depends on these bone points, such as the anterior superior iliac spine, greater trochanter, patella, fibula, upper tibia and ankle.





4.2.2 Influence of leg muscles on body surface performance

Let's take a look at the names and shapes of the bones and muscles of the legs.

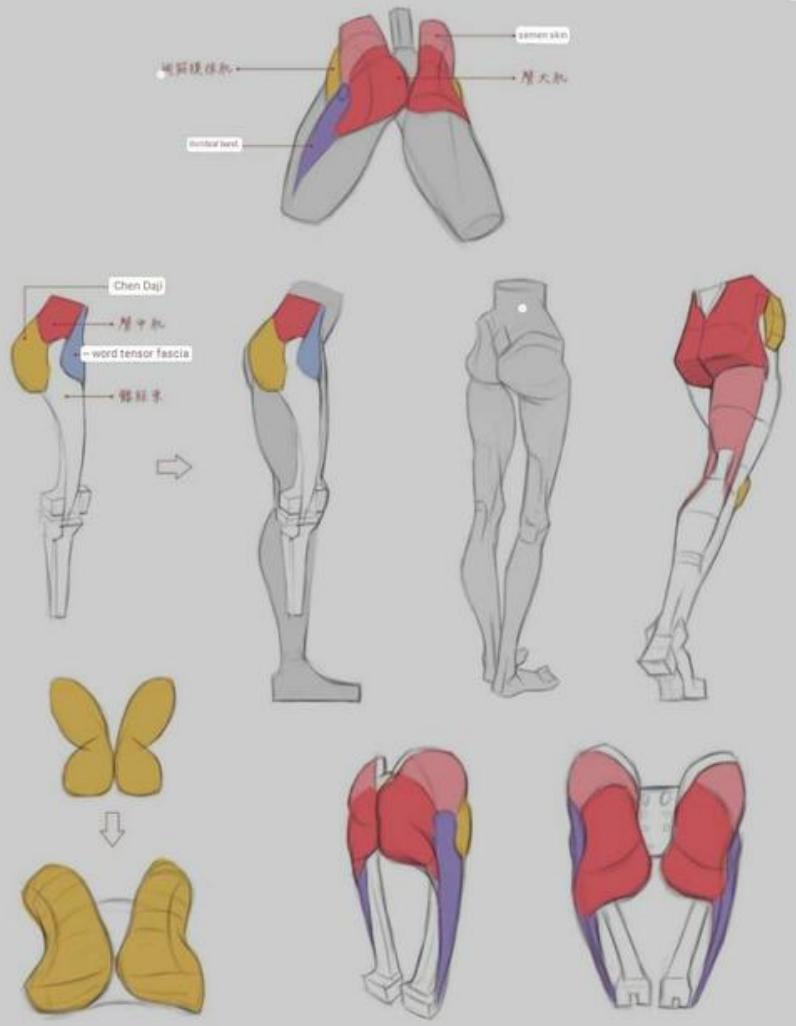

buttocks-
Quadriceps group
hamstrings,
· Quadriceps
· Soleus
hamstrings
soleus muscle

| Tips

Don't be intimidated after reading the complex muscles above. Divide these muscles into 6 groups to understand the purpose of each muscle group and the changes that exercise will have on your body.

- Influence of hip muscles on body surface performance

The buttocks are the junction of the waist and the legs, and are attached to the outside of the pelvis by the thick and wide gluteus maximus, gluteus medius, and gluteus minimus, and the tensor fascia lata on the outer side of the thigh.



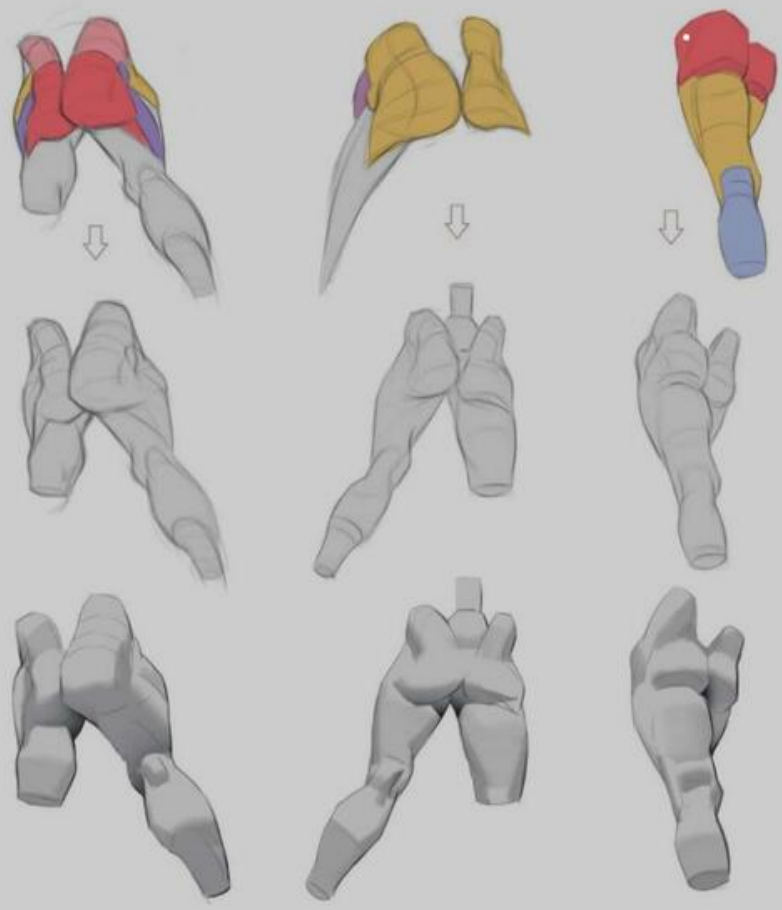
The gluteus maximus is quadrilateral and originates from the back of the ilium, sacrum, coccyx and sacrotuberous ligament. bundle.

The gluteus medius is located outside the iliac wing, and the back of the gluteus medius is located deep inside the gluteus maximus. It is an important muscle that allows us to maintain good posture when walking or standing.

The tensor fascia lata is located on the anterolateral side of the upper part of the thigh, originating from the anterior superior iliac spine. The tensor fascia lata produces force in the hip joint and stabilizes the pelvic muscles.

The fascia in the greater trochanter region is thicker, composed of dense connective tissue, divided into superficial and deep layers, continuous with the myofascia attached to the greater trochanter such as the quadratus femoris and gluteus medius, and with the gluteus maximus fascia and the greater trochanter. of

The periosteum is connected by loose connective tissue.



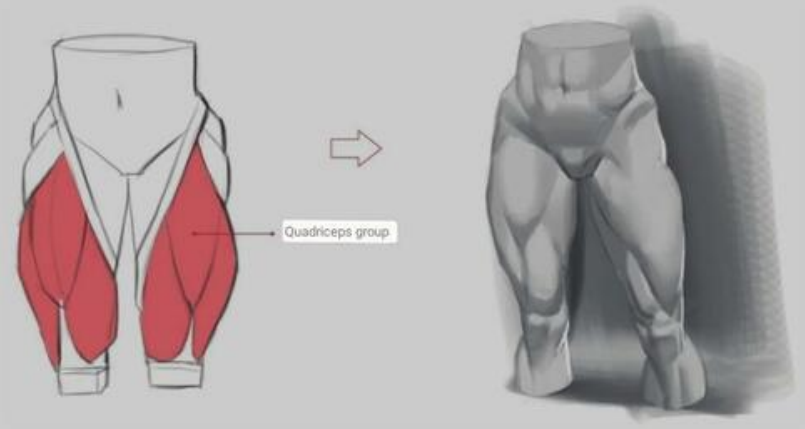
Influence of quadriceps group table performance

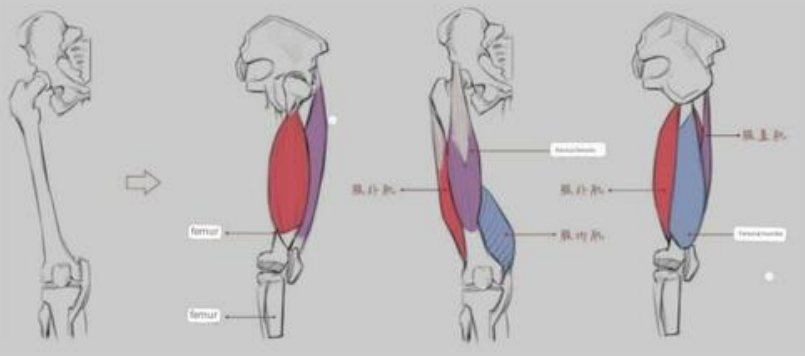
The quadriceps are located on the front of the thigh and have 4 heads.

Origin: The rectus femoris muscle originates from the anterior inferior iliac spine, the vastus medius originates from the anterior aspect of the femoral body, the vastus lateralis muscle originates from the lateral lip of the femoral thick line, and the vastus medialis muscle originates from the medial lip of the femoral thick line.

Insertion: The 4 heads merge into a single tendon that wraps around the patella and forms the patellar ligament downward. in the tibial tuberosity.

Function: In the near fixation, the rectus femoris can flex the hip joint, and the overall contraction can extend the knee joint; in the far fixation, the thigh can be extended at the knee joint to maintain the upright posture of the human body.





Muscle Structure Diagram

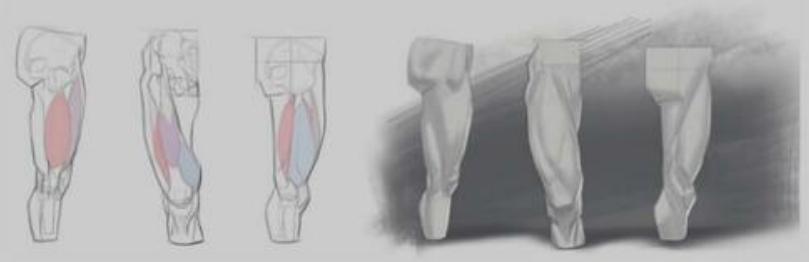


Diagram of the effect of muscles on the body surface

Influence of sartorius and adductor muscle groups on body surface performance

The sartorius muscle is located in the superficial layer of the anteromedial thigh, and the muscle fibers run obliquely from the outer upper to the inner side of the thigh.

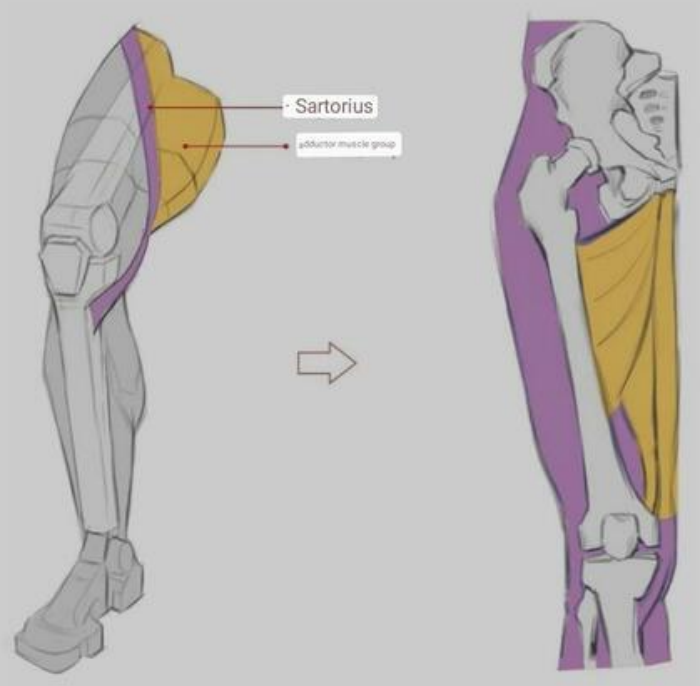
The longest muscle in the human body.

Origin: Anterior superior iliac spine.

Insertion: Medial aspect of tibial tuberosity.

Function: In the near fixation, the hip joint is flexed and externally rotated, and the knee joint is flexed and internally rotated; in the far fixation, the two sides are contracted to make the pelvis tilt forward. We can think of the sartorius as a long strip of paper that wraps around the pelvis and the upper end of the tibia.

The main function of the adductors is to adduction of the thigh and external rotation of the femur. The gracilis muscle cooperates with the anisine tendon to flexion and internal rotation of the knee joint, and the adductor magnus of the ischium cooperates with the hamstrings and gluteus maximus to extend the hip.



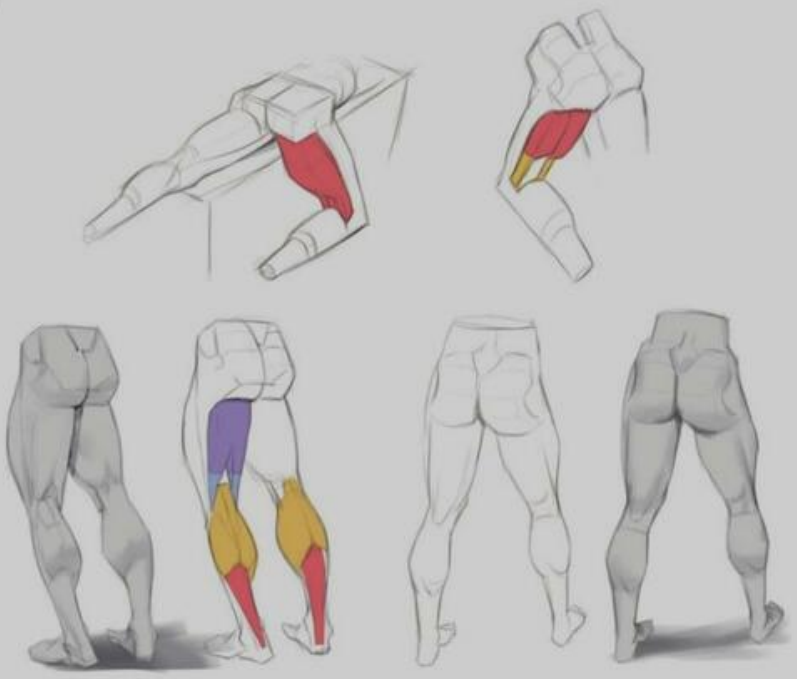
The dynamic structure of the adductor muscle group and the sartorius muscle is shown below.

- The effect of the hamstrings on body performance

The hamstrings are composed of three muscles that are vertically downward from the gluteus maximus, and their main function is to flex the knee joint and straighten the hip joint.

The structural anatomy of the hamstrings is shown below.

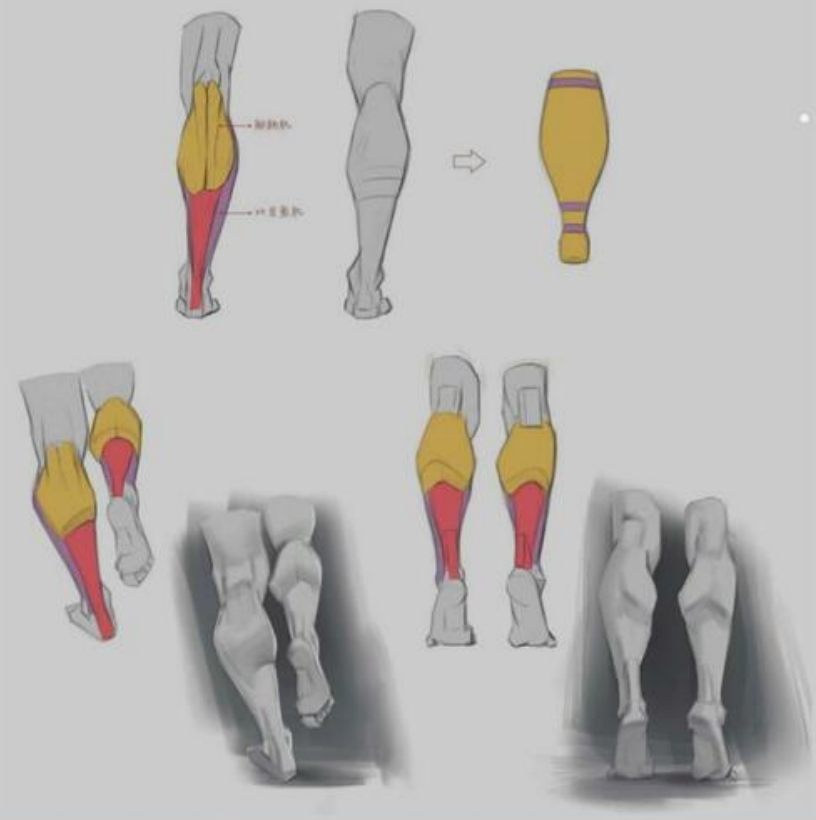
The dynamic structure of the posterior thigh muscle is shown below.



The effect of triceps calf on body surface performance

The triceps calf is divided into the gastrocnemius and soleus. The soleus muscle originates from the posterior end of the tibia and fibula and the soleus line of the tibia, and the muscle bundle moves downward as a tendon. The 3 heads meet to form a bulging calf on the upper part of the calf, which continues downward as the Achilles tendon, which ends at the calcaneal tubercle.

In concrete performance, the calf can be imagined as the shape of a bowling pin. The dynamic structure of the triceps calf is shown below.



hint

When painting light and shadow, the structural transition of muscles determines the division of light and dark sides, so

It is important to learn the structure

well. The impact of the knee on body performance

The skeletal structure of the knee consists of four parts: the thigh bone, the calf bone, the kneecap, and the upper and lower ligaments

grouped.

Looking closely, we will find that the thigh bone is a bit like a pulley with two wheels.

The surface is relatively flat, and the bottom surface has grooves.

The calf bone is composed of two bones, one big and one small. If you look closely, you will find that

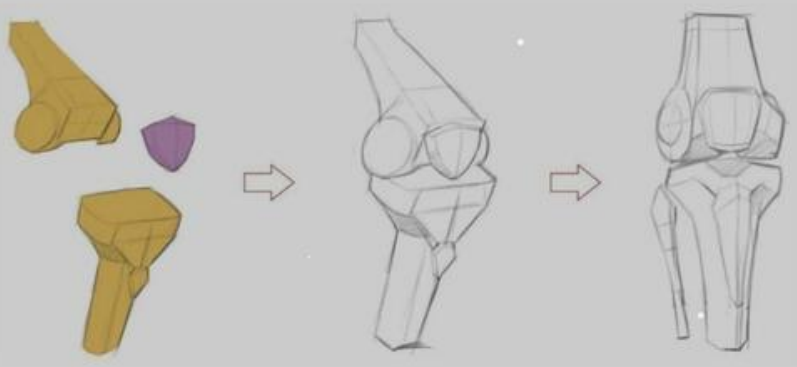
the calf bone is a little like a small platform for the thigh bone to move, and the knee moves like a pulley.

Pay attention here, because the thigh bone is flat in front, and the back and bottom are grooves, so when the leg is

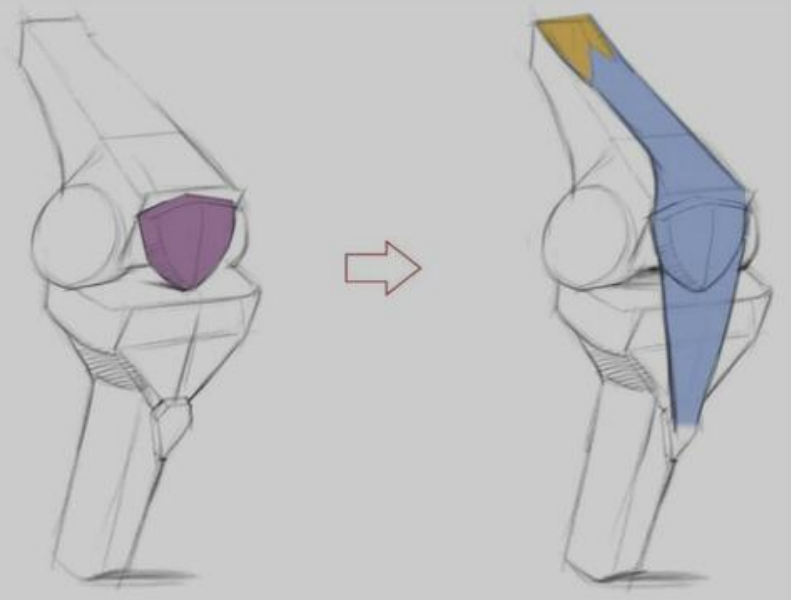
When bent, the part of the groove will be exposed on the front.

The kneecap is connected between the thigh and the calf by two ligaments.

The pulley block provides the fulcrum of movement.

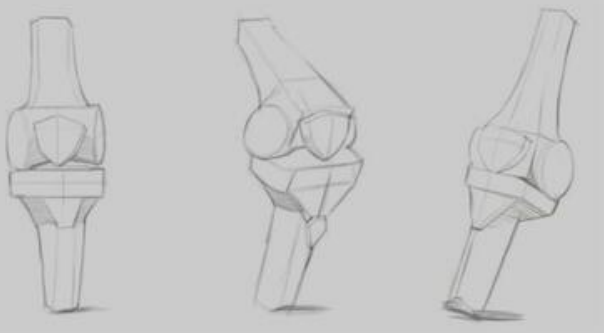


knee drawing



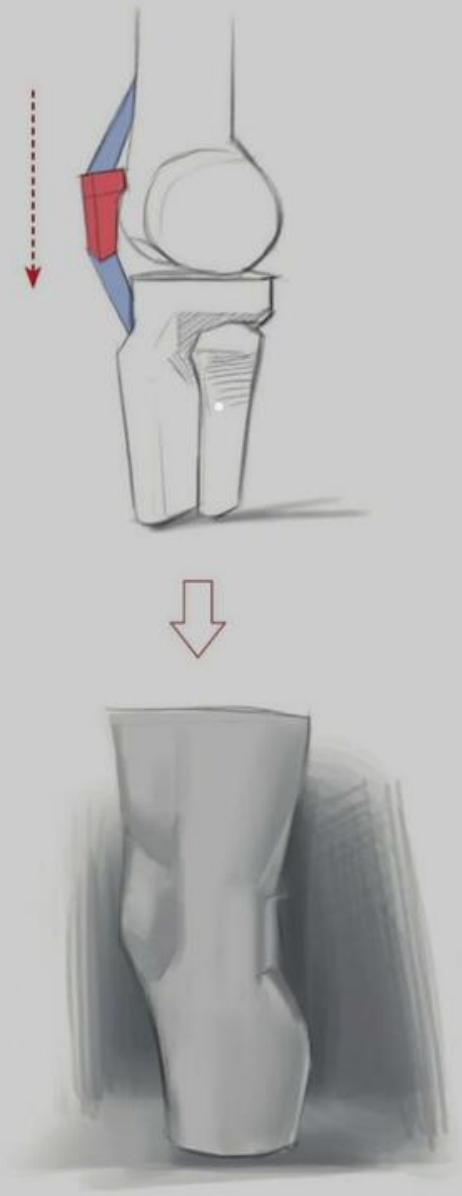
Patellar ligament

Profit

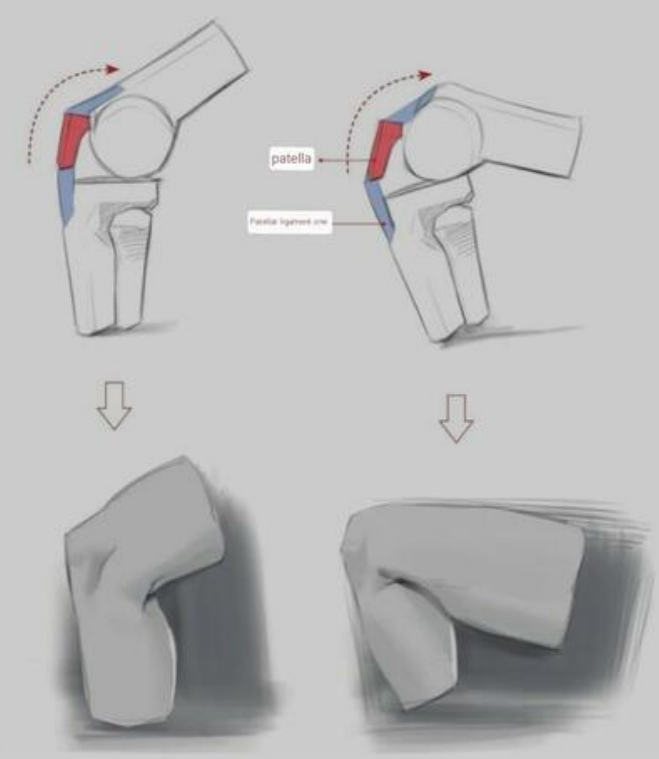


Knee structure at different angles

When the leg is straight, the kneecap is not at the junction of the thigh and calf bones, but rather higher. When the leg is in a flexed state, the part of the groove is exposed due to the pull of the ligaments.

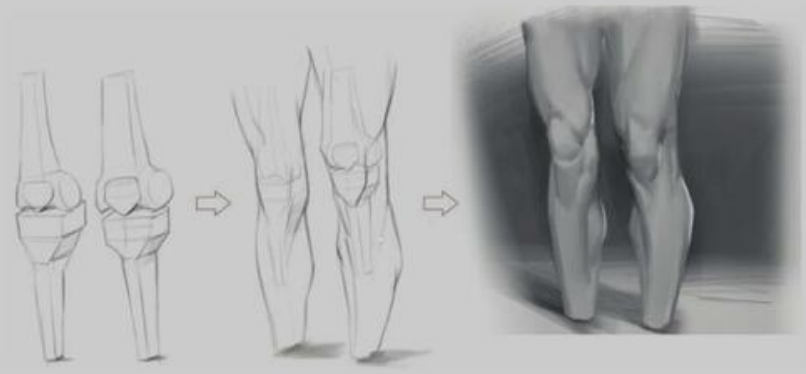


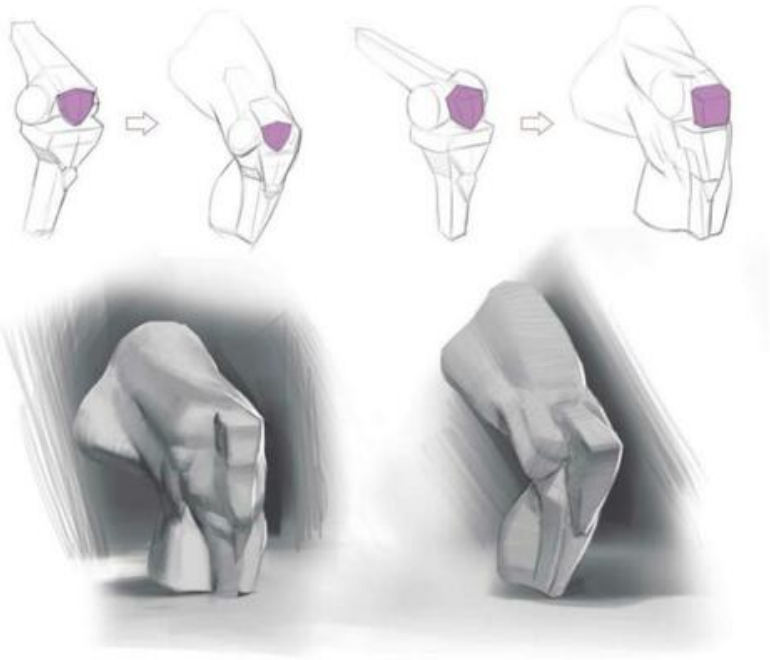
straight state

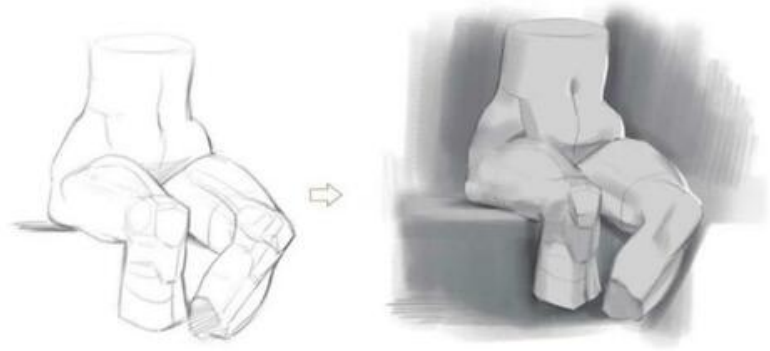


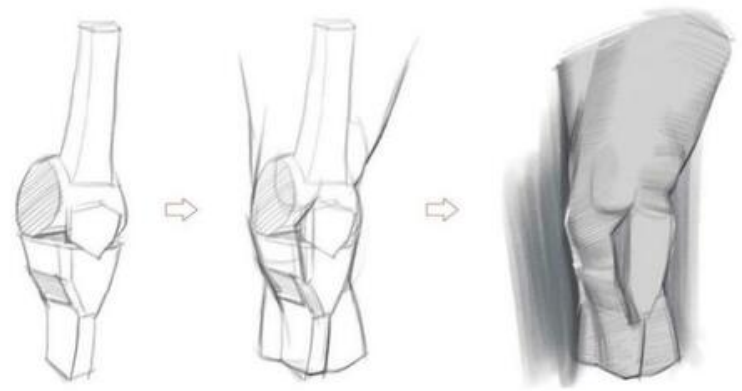
bent state

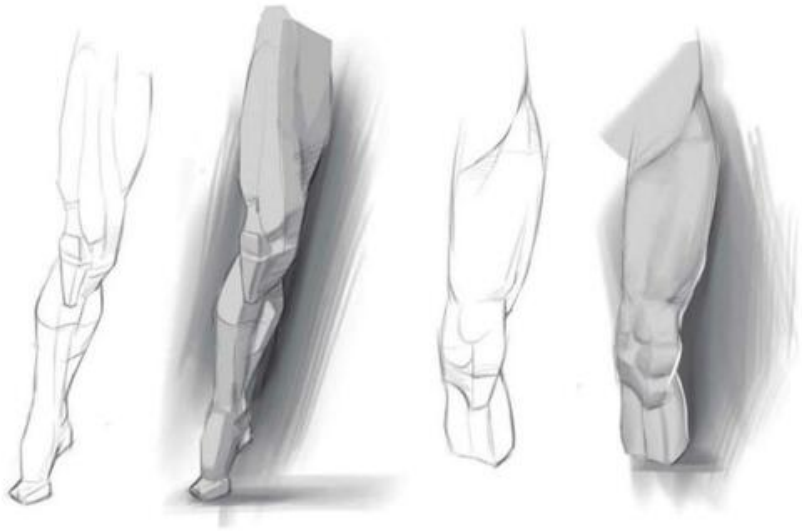
The anatomical analysis of the kneecap is as follows.









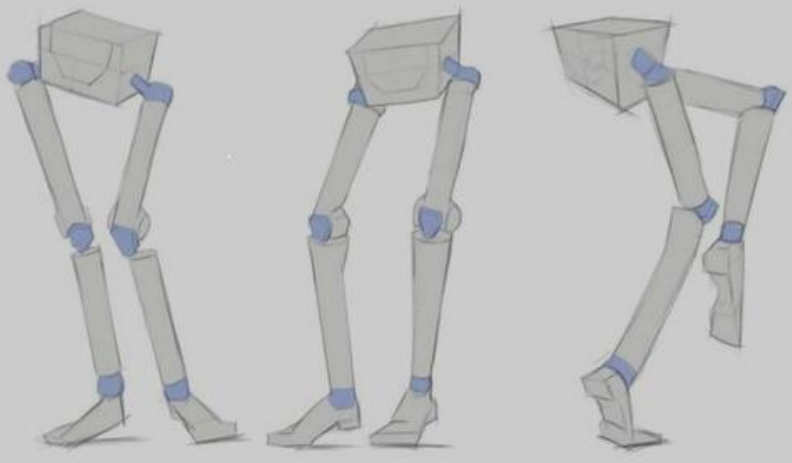


4.3 The connection between the legs and the pelvis and feet

In daily life, the movement of people's legs will directly affect the pelvis and feet, so here we need to first understand how the pelvis and thighs are connected together, and how with the movement move and influence each other.

Let's first understand the connection between the legs and the pelvis, and how they move.

Think of the legs as cylinders growing out of a cuboid and growing downwards, making different movements by twisting the span and knees.



The pelvis is the connecting point between the spine and the femur, and it is also an important skeletal structure in the human body.

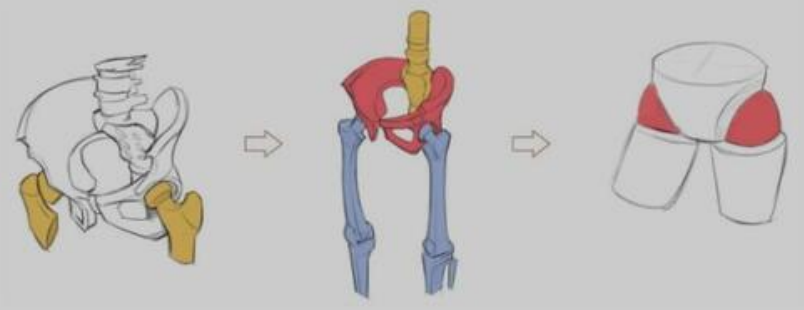
4.3.1 The connection between the legs and the pelvis

Here we reduce the complex structure to a cuboid (pelvis) and two spheres (torsion axis between pelvis and femur), and two cylinders (femur).

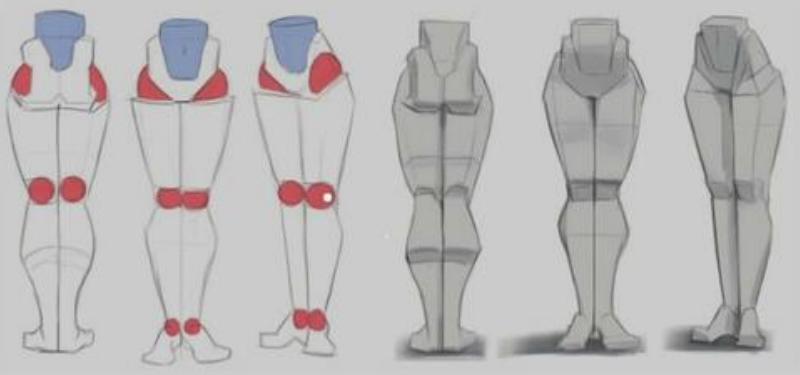
stitching together simplified blocks to form dynamic poses, which can better understand people

The laws of movement of the body.

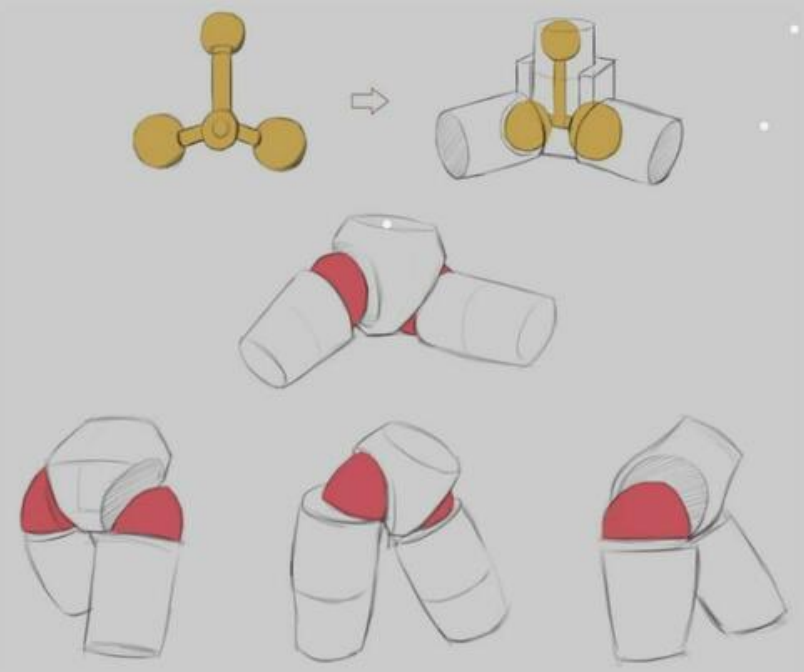
When we draw the human body, You can also shape the pelvis into step by step, make the shape more Realism.



The leg shapes of different angles are summarized as follows.



When expressing the leg in motion, it should be noted that the range of motion of the leg is limited, because in daily life people will not do a particularly large twist.



4.3.2 Connection between legs and feet

When expressing the connection between legs and feet, attention should be paid to the height of the inner and outer ankles. Generally, the inner ankle is higher than the outer ankle, showing a state of inner high and outer low.

outside foot

4.4 Torsion and dynamic performance of legs

After understanding the skeletal and muscle structure of the leg, it is necessary to do some research on the perspective and stretching deformation of the leg muscle structure under different rotation states.

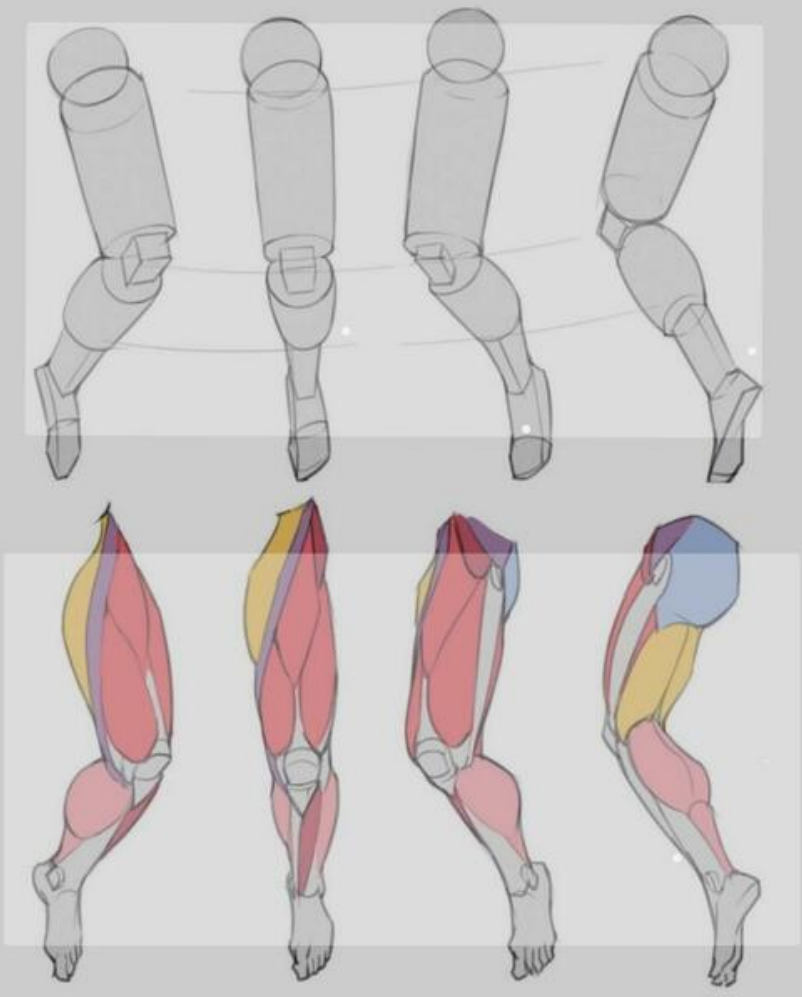
4.4.1 Twisting of the legs

The leg can be regarded as a cylinder, and the proportion and perspective changes of the cylinder can be grasped when expressing. Separate the two parts of the cylinder with a square at the knee, and then add the leg muscle structure to be drawn in the inner space of the cylinder, so that the shape of the legs can be restored at all angles.

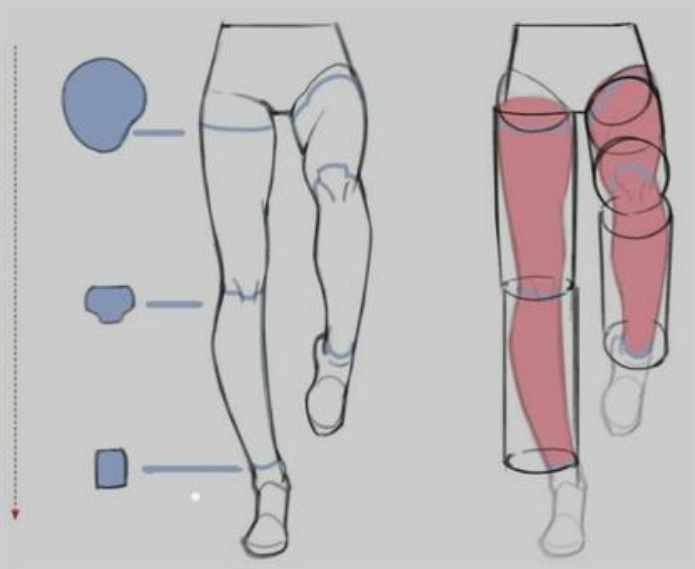
cyqg116688

To find Chinese and English

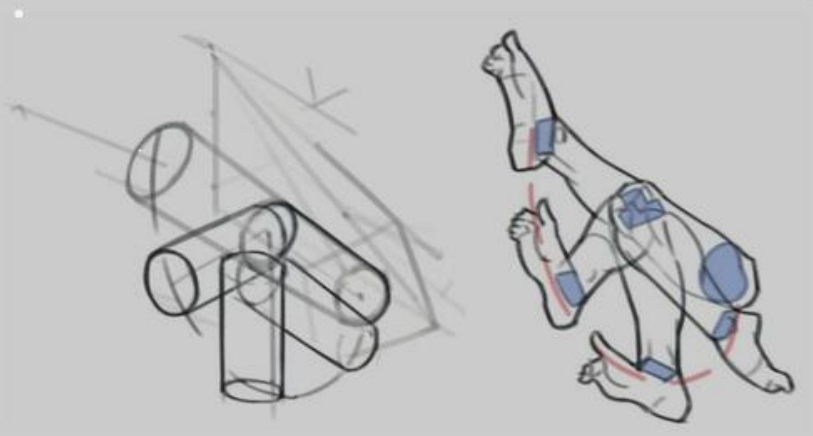
e-books, scan the QR code pattern above, add me on WeChat



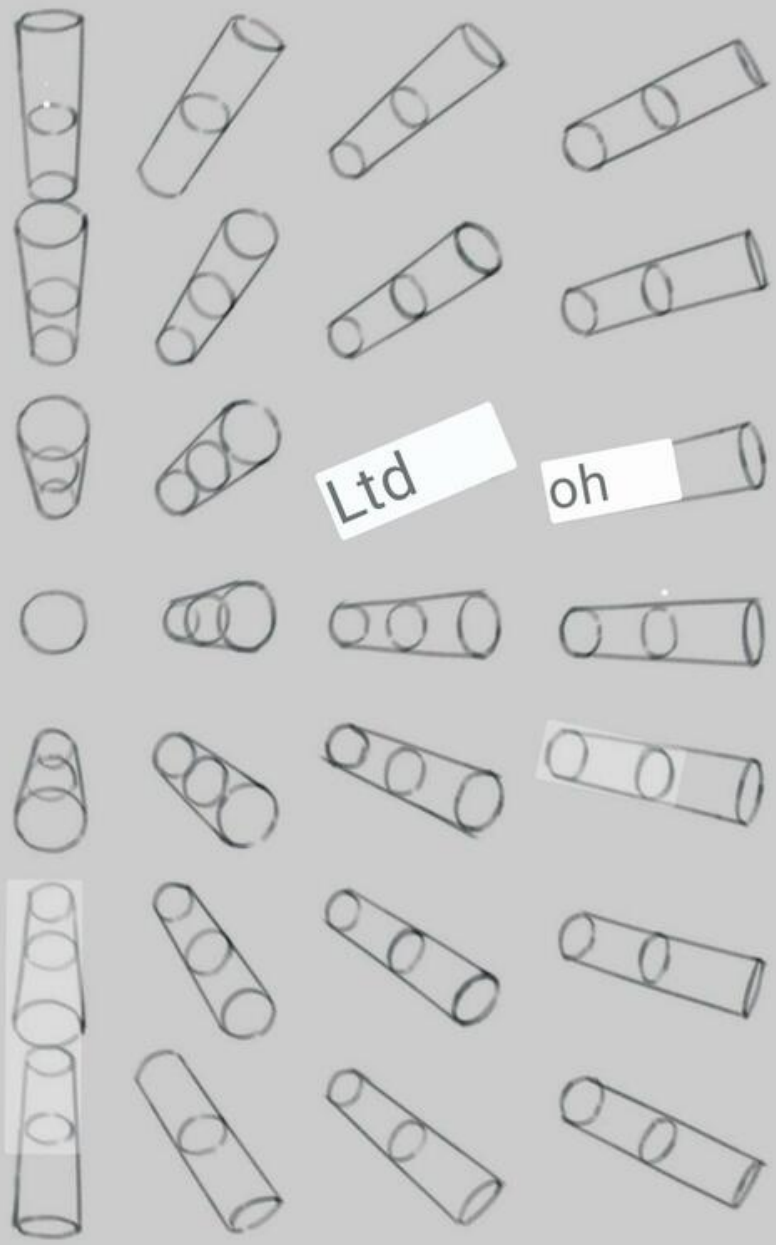
When drawing a twisted female leg, draw less muscle structure and just show the key muscle structure as you did for the arm.



Draw a cross section on the corresponding leg structure, and calculate the morphological changes of each angle of the leg. If you want to express a bent leg, you can also use the bending trajectory of the cylindrical structure of the calf to calculate the shape of the bent leg.

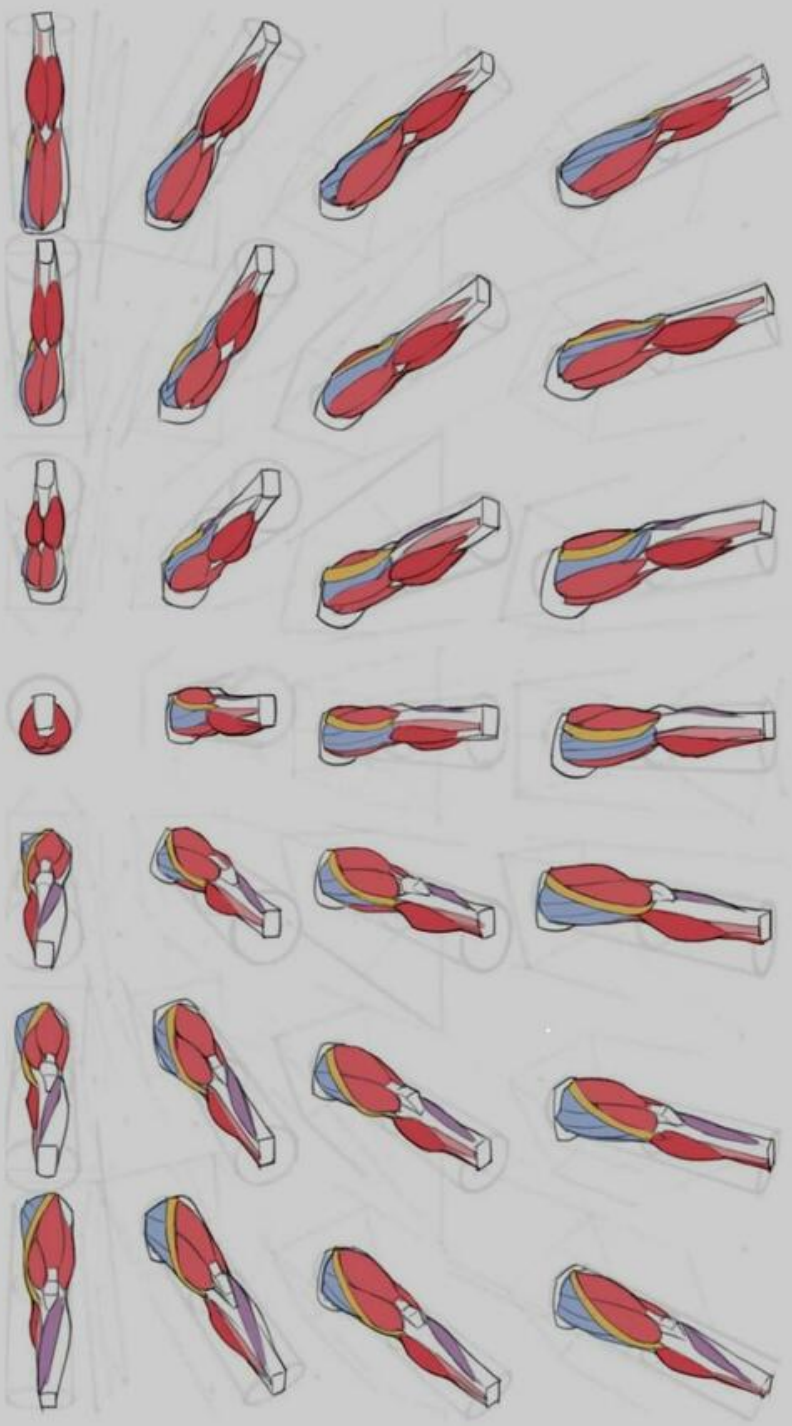


Draw legs by cross-section, and calculate the shape of the legs in space according to the perspective relationship of the cylinder state.

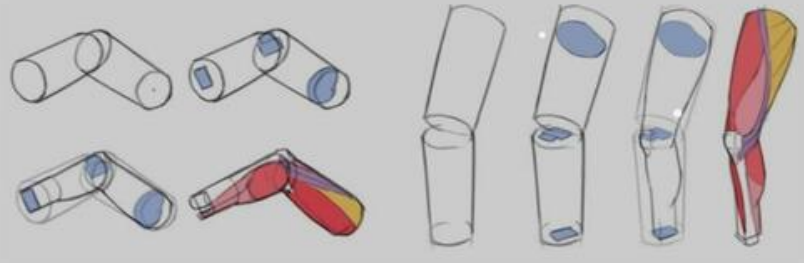


First draw cylinders with different angles, then use the cross section to determine the key positions of the leg structure,

and draw the outline of the leg according to the muscles of the leg.



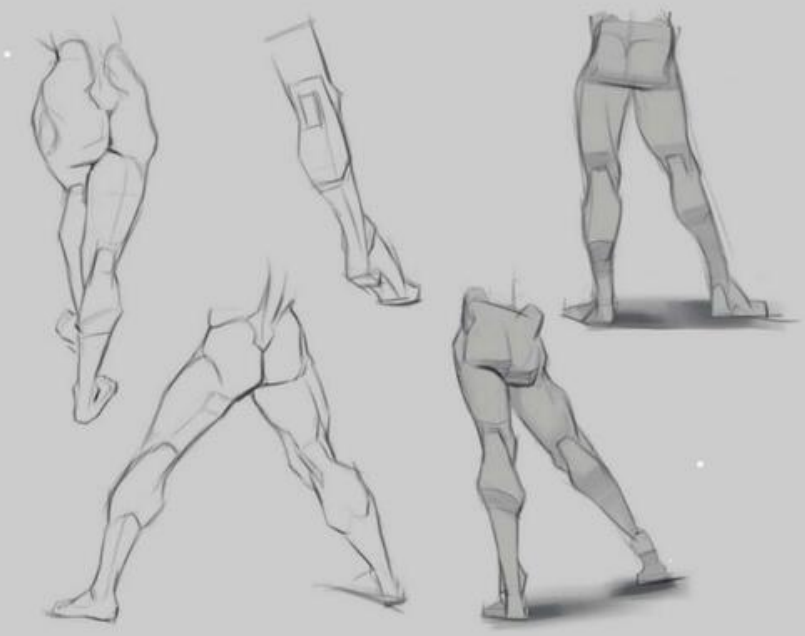
This method can quickly grasp the simplified drawing method of the leg, and further analyze the changes of the leg muscles under the torsion state through the understanding of the muscle structure.

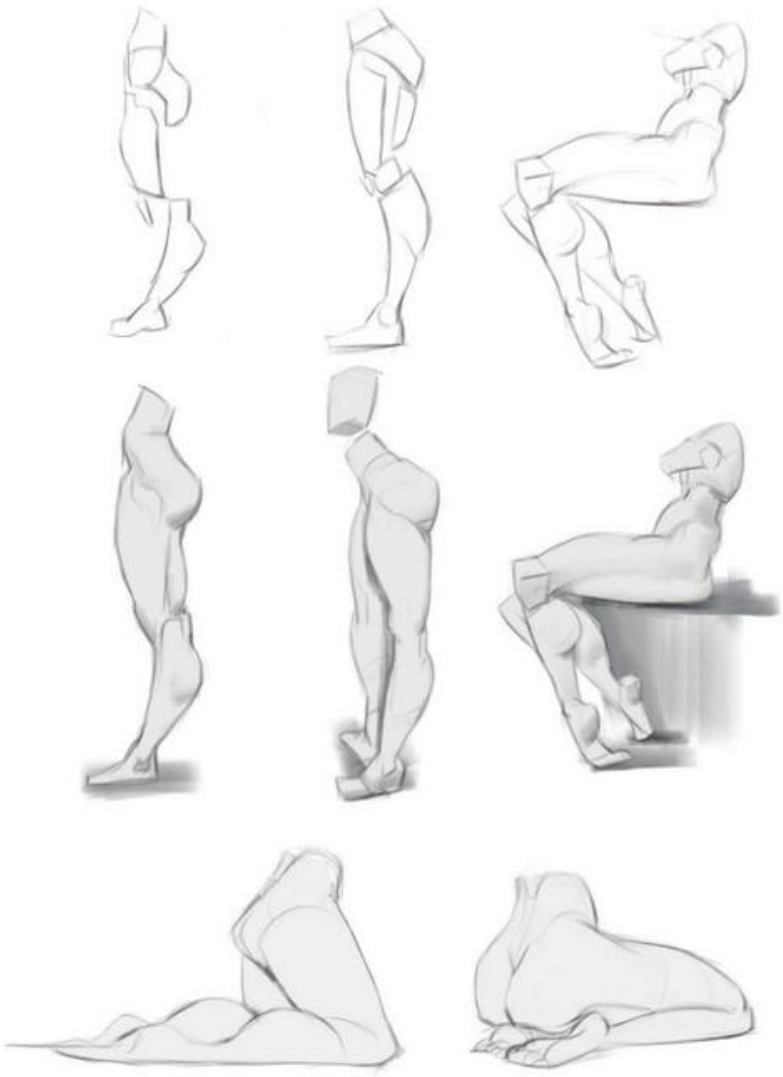


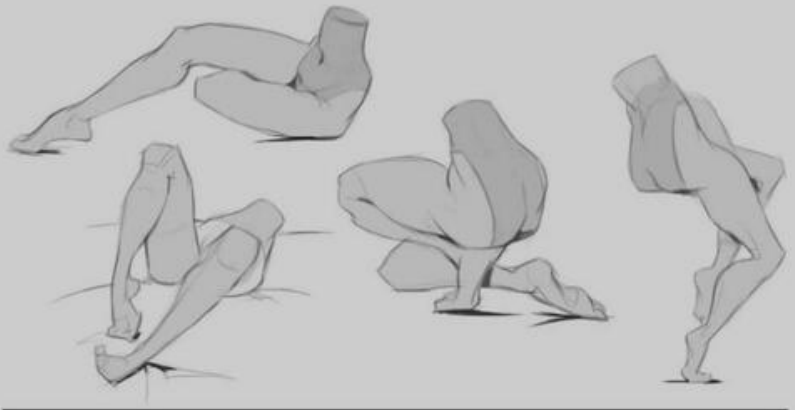
4.4.2 Dynamic performance of legs

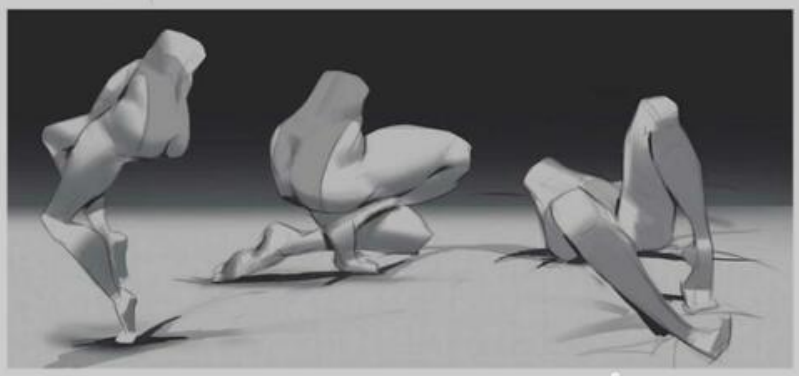
The leg dynamics are simpler to express than the arm dynamics. The joints of the thigh and calf can only be bent backwards. Pay attention to the squeezing state of the muscles when bending.

Showing the dynamics of the legs is more about showing the relationship between the legs and the crotch. When a person is standing, the legs supporting the center of gravity will push up the crotch.



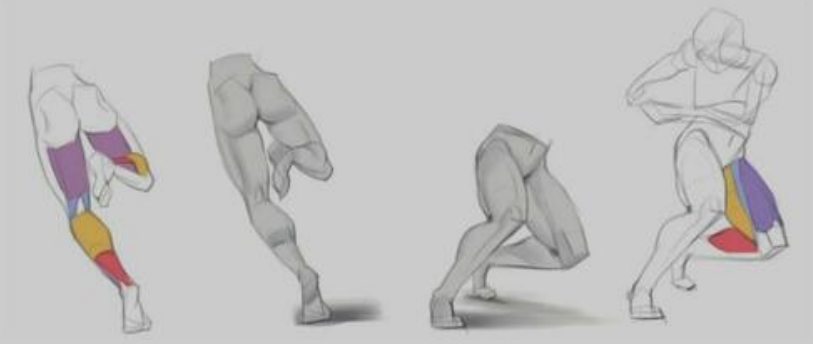






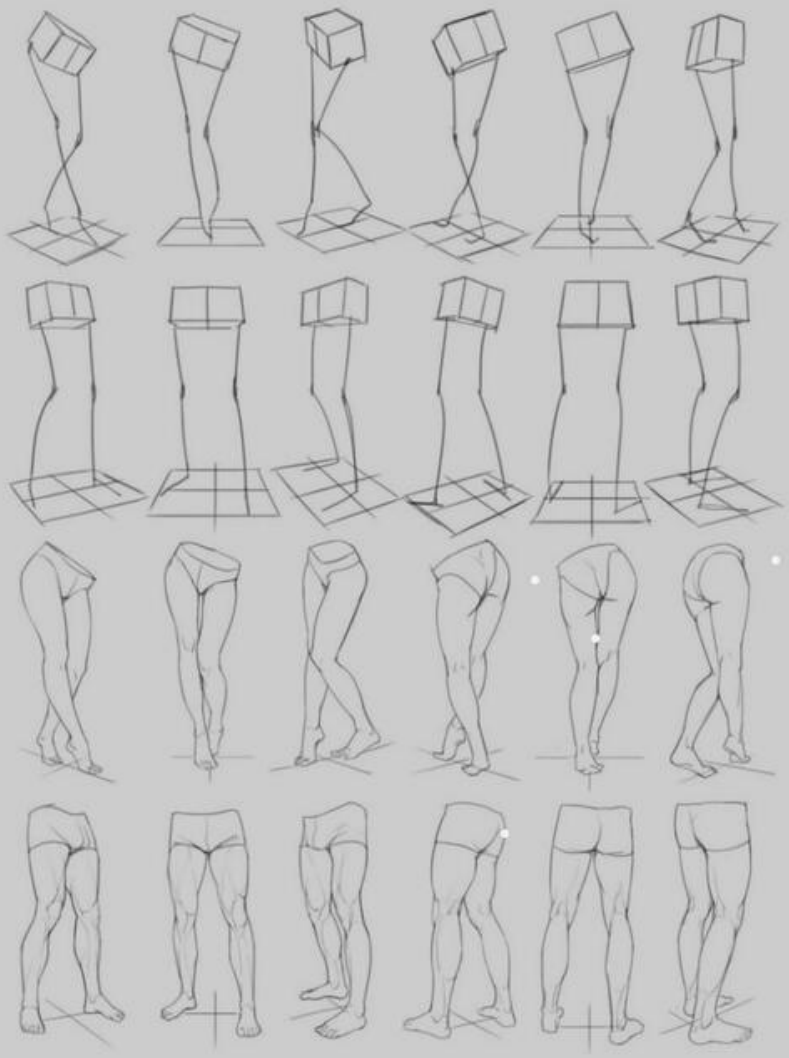
When expressing the posture of the legs exerting force, pay attention to the inclination direction of the center of gravity and the movement direction of the legs.

Towards.

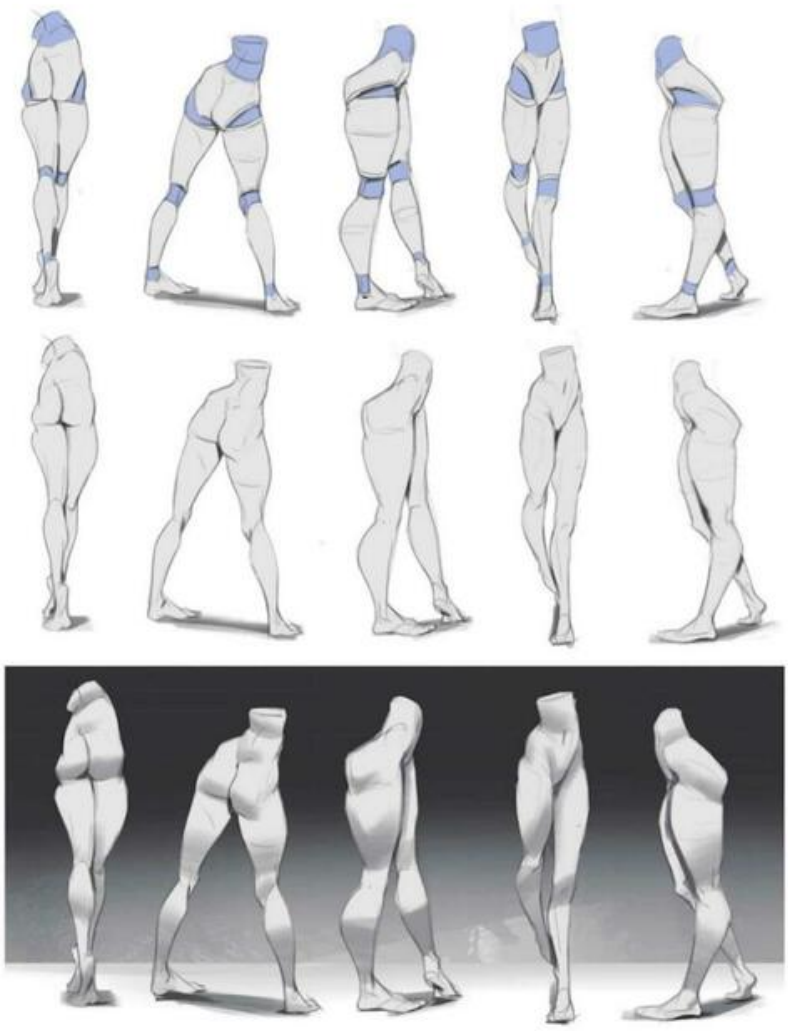


More special training

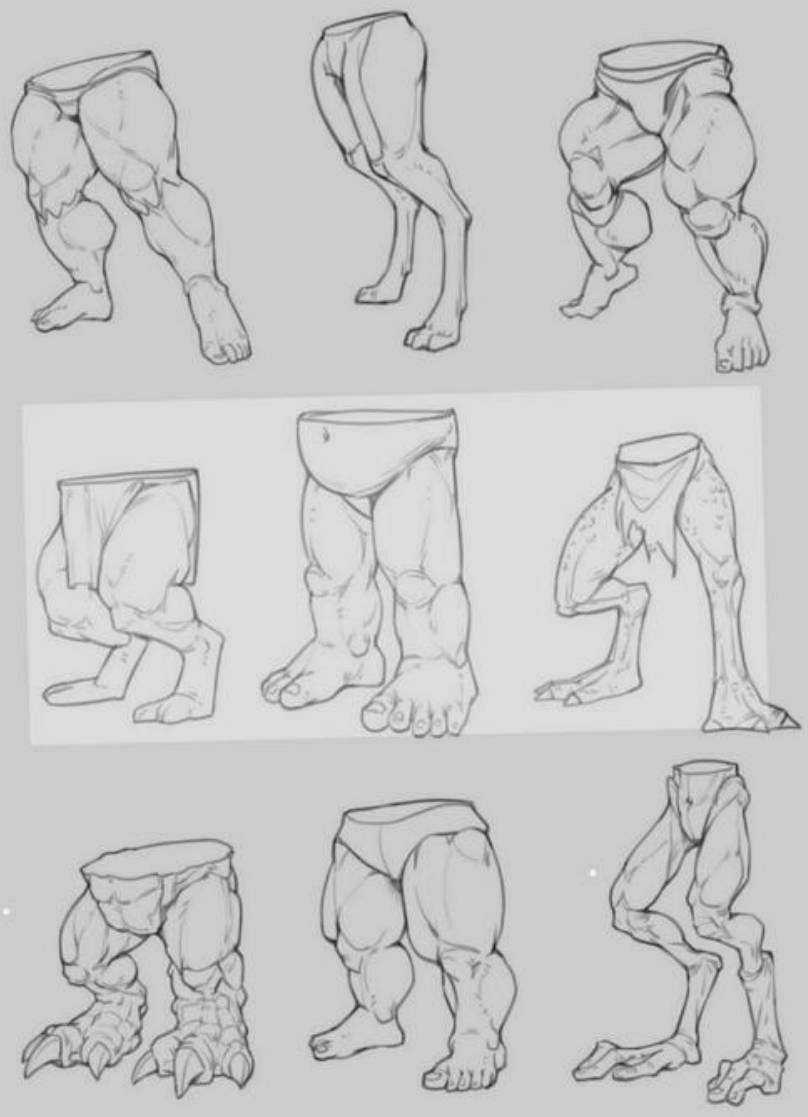
Do a set of male and female leg exercises in a twisted position.



Do a set of leg exercises in a standing position.



Do a set of exaggerated leg exercises in a standing position.



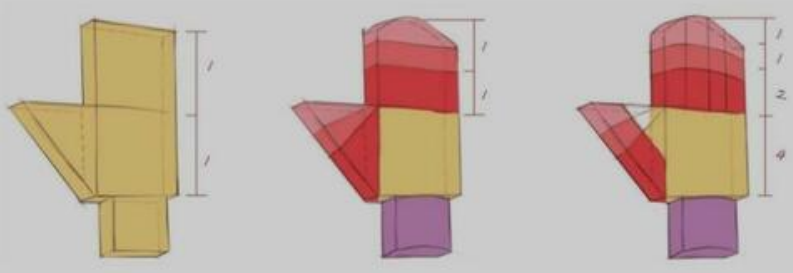
Chapter 5 Specialized Hand Training

The hand is one of the difficulties in human body painting. When beginners do not fully understand the structure of the hand, they often draw the hand very "flat", that is, there is no three-dimensional sense. This chapter will focus on leading you to understand the structural blocks of the hand, starting from the proportion and structure, analyzing the influence of bones and muscles on the contour of the hand, and finally explaining the connection and torsion laws of the hand in depth.

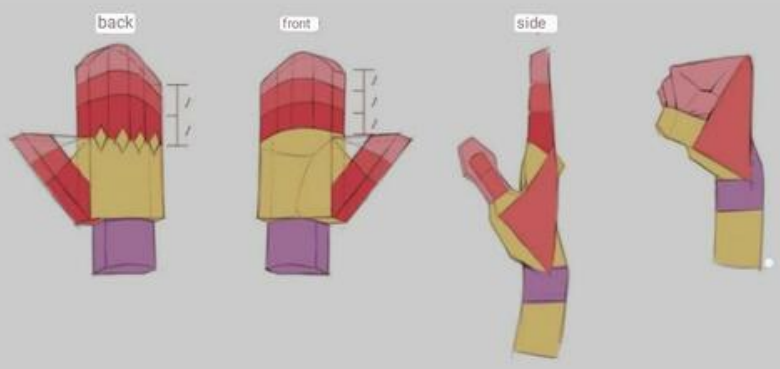
5.1 Proportional structure of the hand

Before studying the hand, it is necessary to clearly know the proportion of each part of the hand, and refine the structure on the basis of the correct proportion.

To understand the hand, you can start with the proportional relationship of the plane. The following figure shows the proportional relationship of the back of the hand.



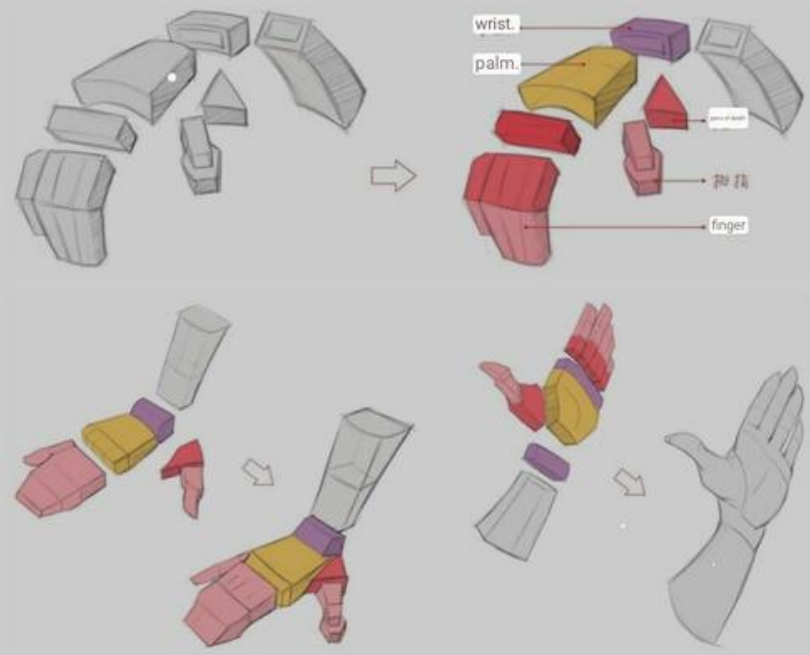
The proportio.. of the palm is slightly different from that of the back of the hand, and the proportion of fingers is slightly smaller. When viewed from the side, the boundary between the fingers and the center of the palm is sloped. When making a fist, some joint structures will be exposed after the fingers are curled, so the back of the hand is slightly longer when making a fist.



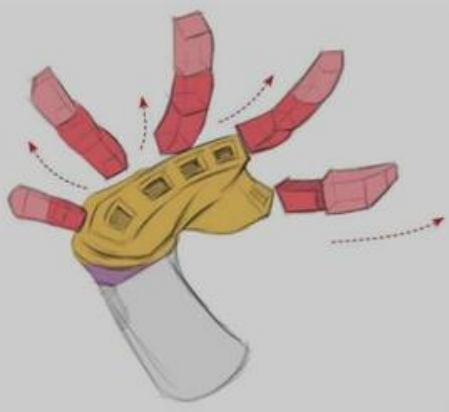
The structure of the hand is relatively complex in the human body, involving various swings of five fingers and multiple joints, and it is difficult to capture the shape in place. In addition, the subdivision structure of the fingers is intertwined, which makes people who want to learn hand drawing but have a weak sense of space fear. When drawing hands, the most important thing is the training of spatial ability, showing various spatial interlaced relationships (for

This is explained in detail in "5.4 Hand Twist and Dynamic Performance").

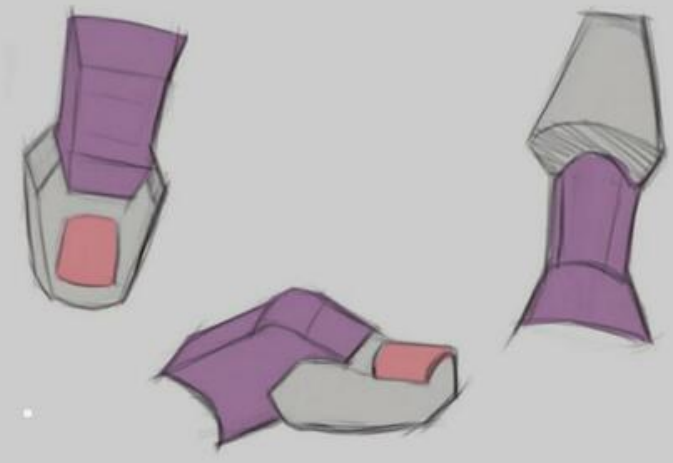
We decompose the hand into five parts: palm, wrist, tiger's mouth, thumb, and fingers.



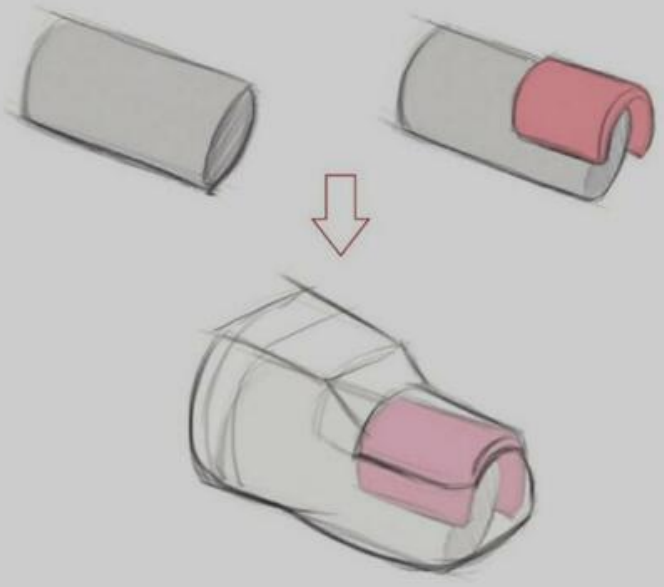
When drawing shapes in spatial perspective, one should not be restricted by some vague outlines. Only by finding out the spatial geometric relationship of the shapes, can the complex structure and spatial relationship be handled with ease on the premise of accurately grasping the large shape.



The thumb structure of the hand is summarized as follows.



Nails grow on the fingers and change according to the curvature of the fingers.



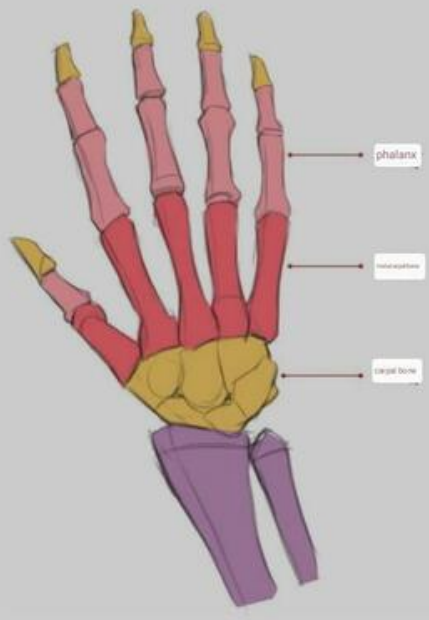
5.2 Influence of hand bones and muscles on body surface performance

This section explains the influence of the bones and muscles of the hand on the surface performance of the hand.

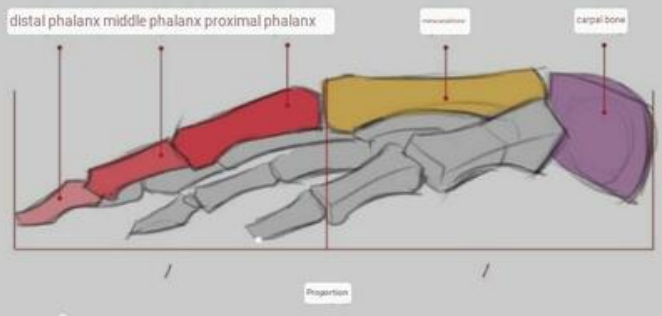
Memorize the impact of key bone points and important muscle stretches on the hand.

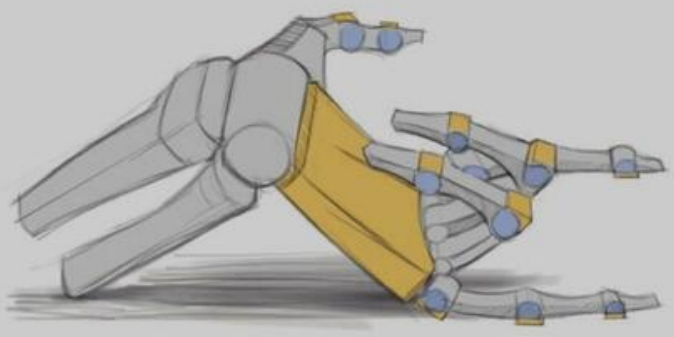
5.2.1 Influence of hand bones on body surface performance

The bones of the hand are roughly divided into three parts: the phalanges, the metacarpals, and the carpal bones.



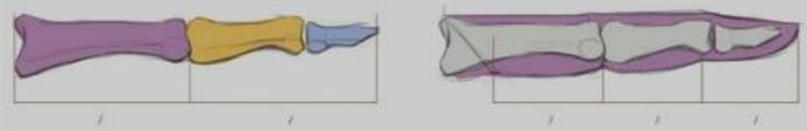
The phalanx is subdivided into the distal phalanx, middle phalanx, and proximal phalanx.





The phalanx has a great influence on the contour of the hand, especially the finger joints. Viewed from the side, the length of the first knuckle of the phalanx = the length of the second knuckle + the third knuckle length.

The proportions of the joints of the finger pulp are presented as three equal parts.

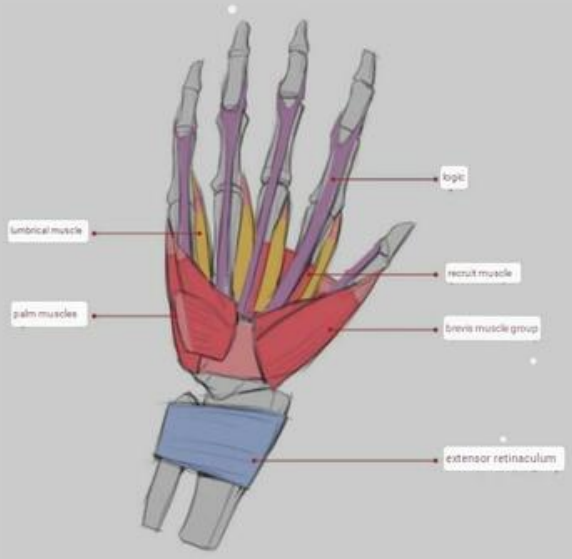


When expressing the state of bending of the fingers, the place where the fingers are connected can be regarded as a bridge, and the blue structure composed of the piers (yellow) and the deck (purple) allows the fingers to bend freely.

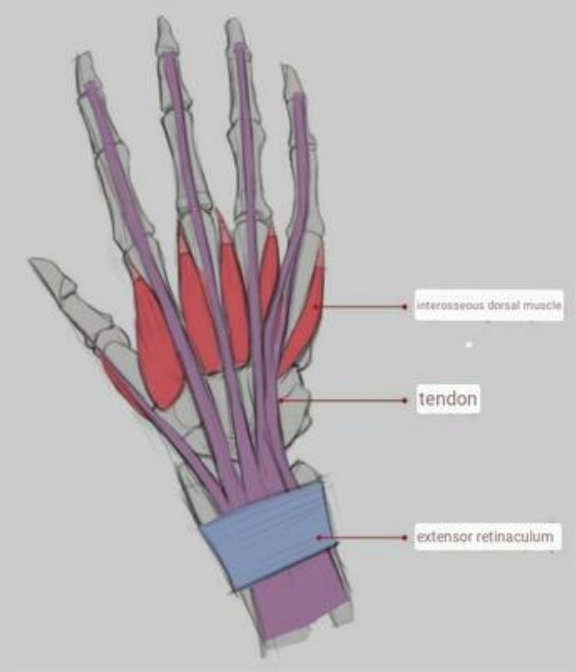
The contrast relationship between the hand skeleton and the hand contour is as follows.

5.2.2 Influence of hand muscles on body surface performance

The muscles of the hand contour are concentrated near the palm and thumb. As can be seen from the figure below, the muscles of the hand have a great influence on the contour of the palm. Two thick pads are formed near the palm and the thumb, and the muscles of the back of the hand are concentrated in the gap, making the back of the hand appear to have a certain curvature.

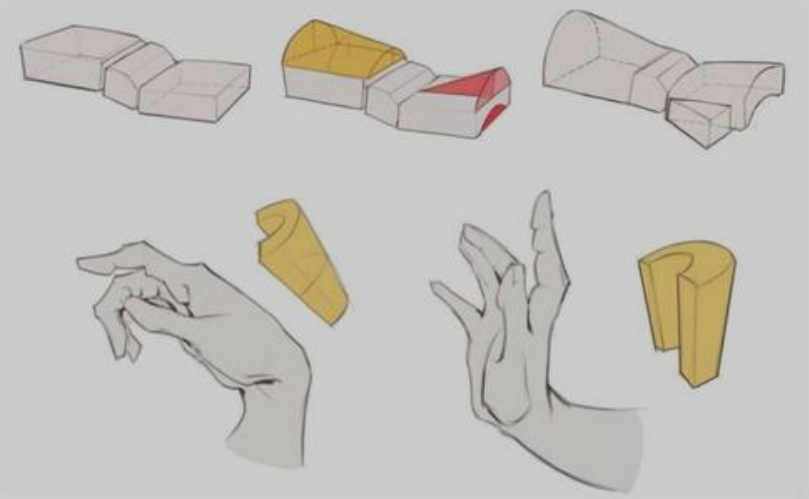


palm

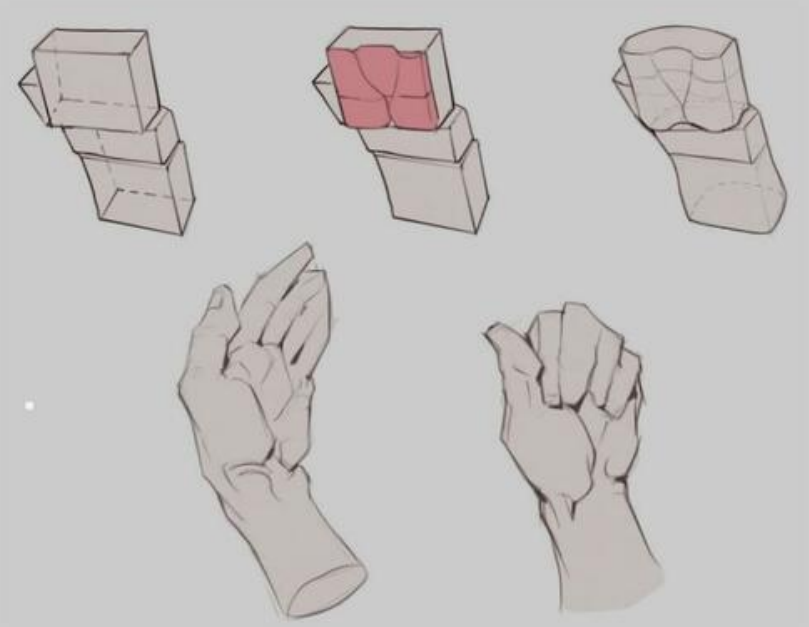


back of palm

The body block structure is used to represent the muscle shape characteristics in the above picture, so that the drawn hand shape is more vivid, sensual, and more realistic, such as the curved surface of the back of the hand and the shape of the pad of the palm.



Curved surface of the back of the hand



pad of palm

5.3 Connection of the hand

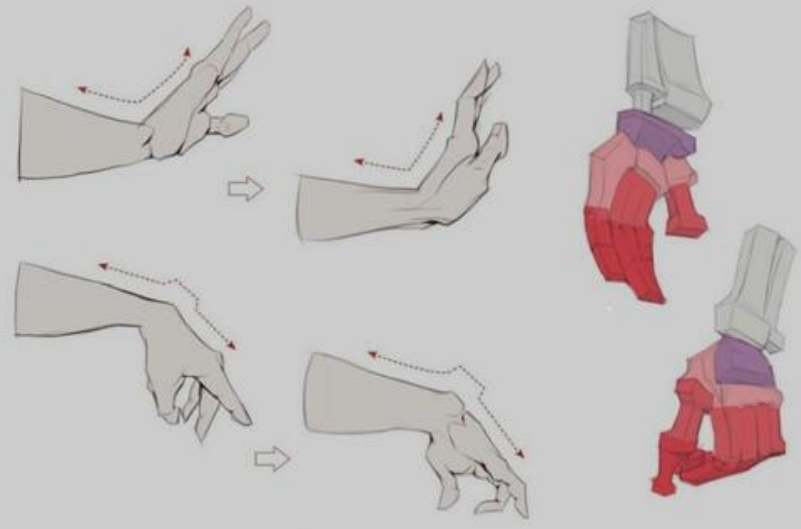
The connection relationship of the hand is divided into the connection between the hand and the wrist and the connection between the palm and the fingers. These two places are often overlooked by beginners. Once they are not careful when painting, the drawn hand will have no wrist or finger connection. The position looks stiff.

5.3.1 Hand and wrist connection

The wrist is protruding from the arm and the palm, and it seems that there is a difference in the connection between the forearm and the palm

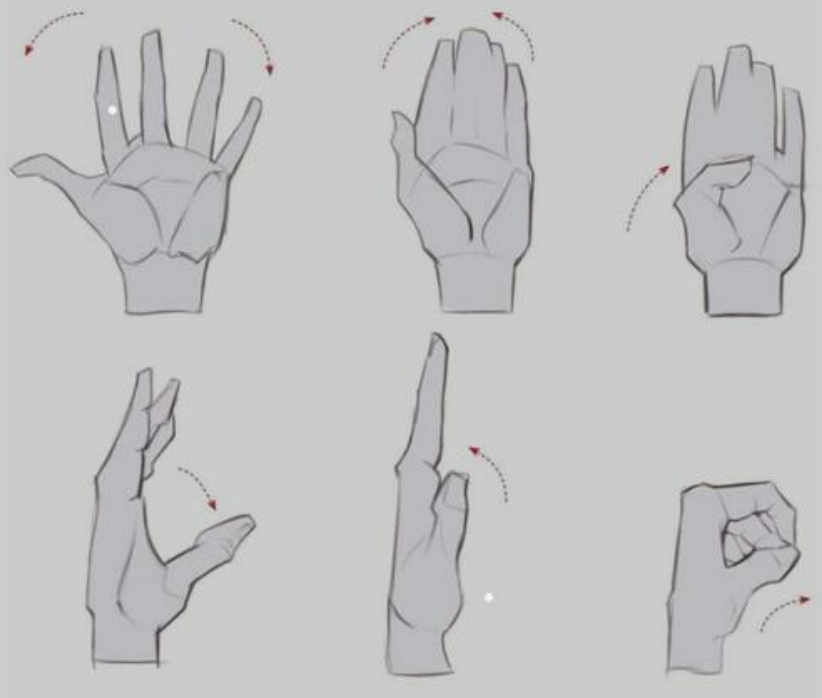
Case.

The height difference between the forearm and the palm is not obvious when the hand is raised, especially when the hand is lying flat and sagging naturally.

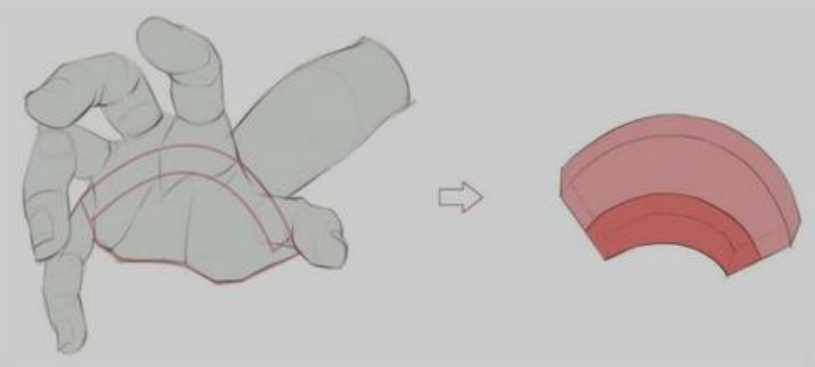


5.3.2 Connection between palm and fingers

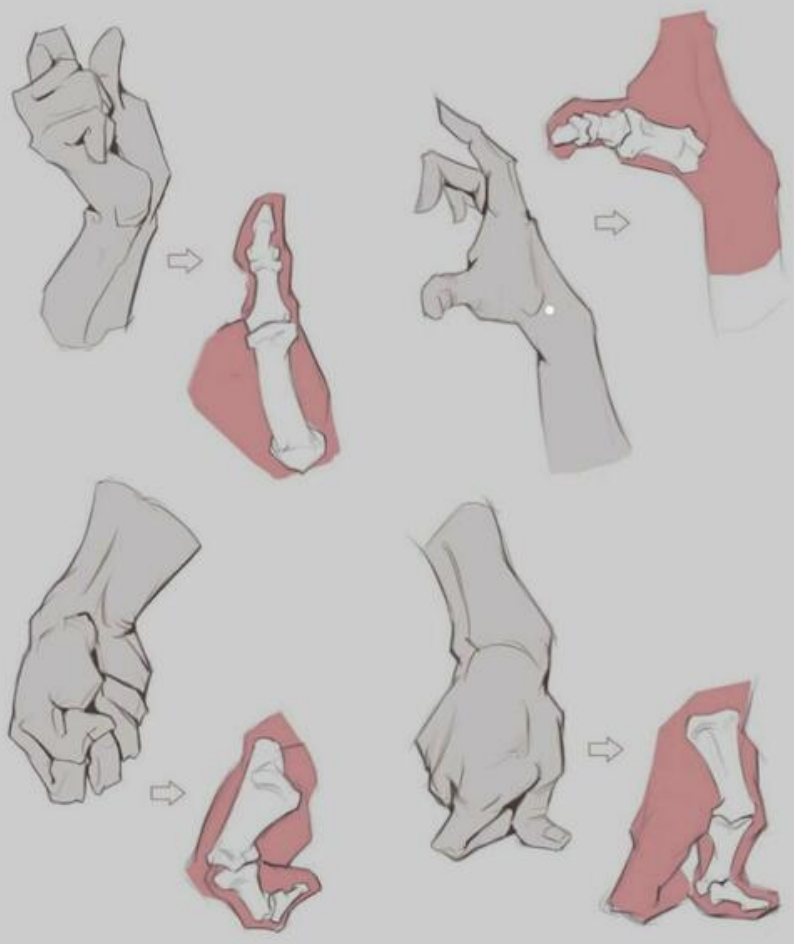
The connection between the palm and the fingers is relatively simple. The connection between the thumb and the palm is different from the connection between other fingers. The connection between the thumb and the palm is more flexible and has a wider range of motion.



When the thumb is bent downward, it will form a certain arc with the palm. In order to draw the hand more vividly, it is necessary to draw this arc.



The joints of the thumb itself are more flexible and can often bend backward and deform more than the other four fingers.



hint

When expressing the fingers, try to avoid placing the fingers side by side or facing the same direction.

Adjust it to avoid stiffness.

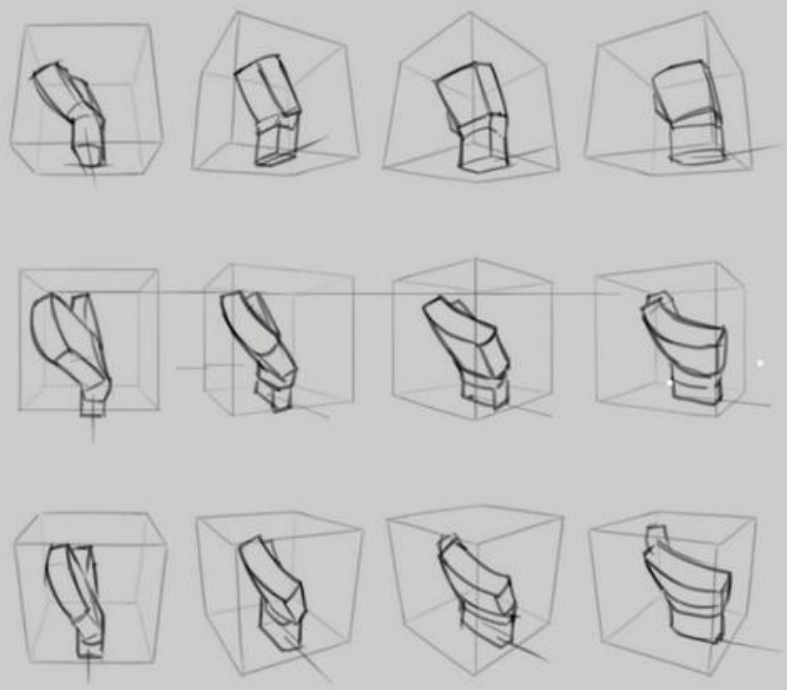
5.4 Hand twist and dynamic performance

After understanding the structure of the hand, you can draw the hand with the same action and different angles in different perspective spaces, and draw different dynamic hand shapes.

5.4.1 Hand twist performance

The study of hand torsion is a test of the cognition of the sense of space of the hand, to see if it is possible to infer the shape of other angles of this dynamic according to the dynamic of a hand. In daily practice, you can do more of these exercises to strengthen the cognition of the sense of space.

Use the cube to determine the perspective space, and draw the palms of different angles in the perspective space. The mass relationship between the wrist and arm.



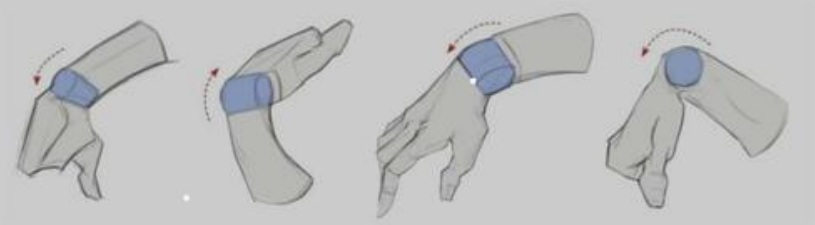
Draw fingers on the basis of the body, divide the fingers into groups as much as possible, here the thumb and index finger are separated

Here, draw the muscle thickness of the palm.

Refine the hand structure, pay attention to the orientation of each finger as different as possible.

5.4.2 Dynamic hand performance

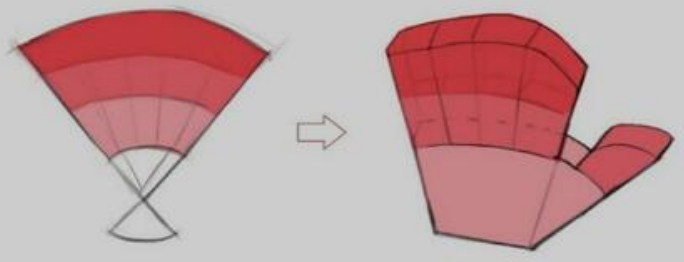
Studying hand dynamics requires studying the wrist at the same time to check whether the wrist is connected naturally and smoothly. The wrist joint is the largest joint in the hand, and its movement changes affect the movement trend of the hand.



Twisting at the junction of the palm and fingers affects the overall contour of the hand.

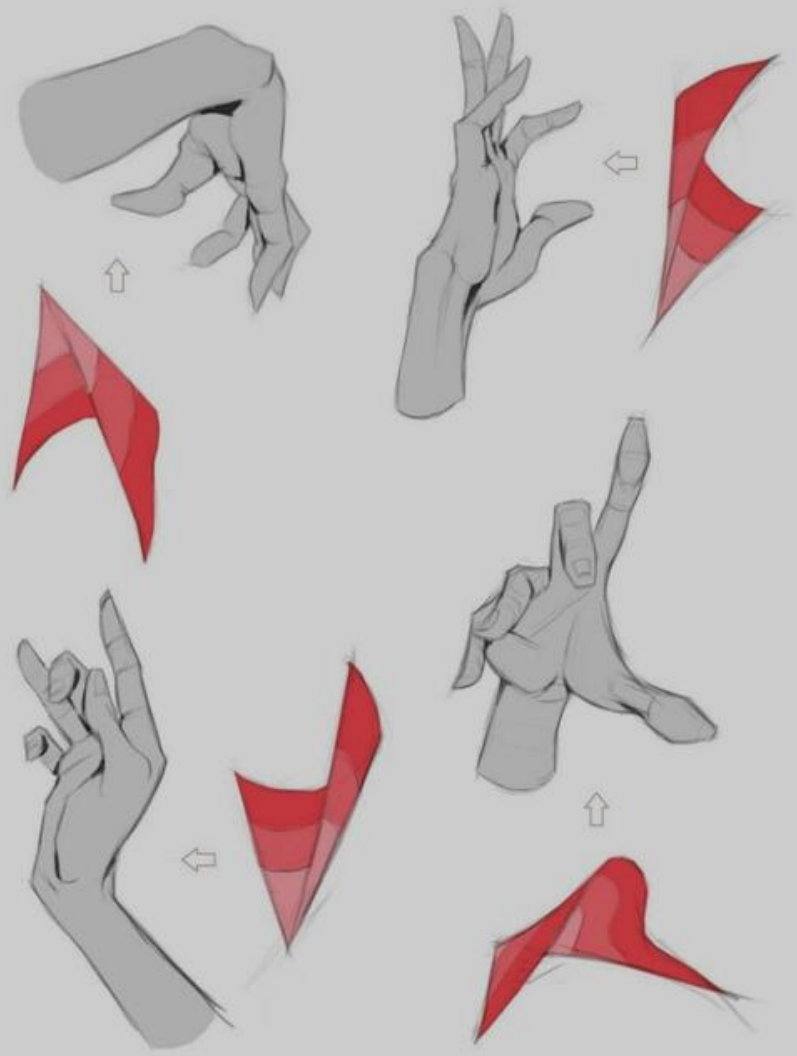
If you want to draw the dynamics of a good hand, you should usually observe some morphological changes when your hand moves.

Think of 5 fingers as a fan that can be opened and closed.

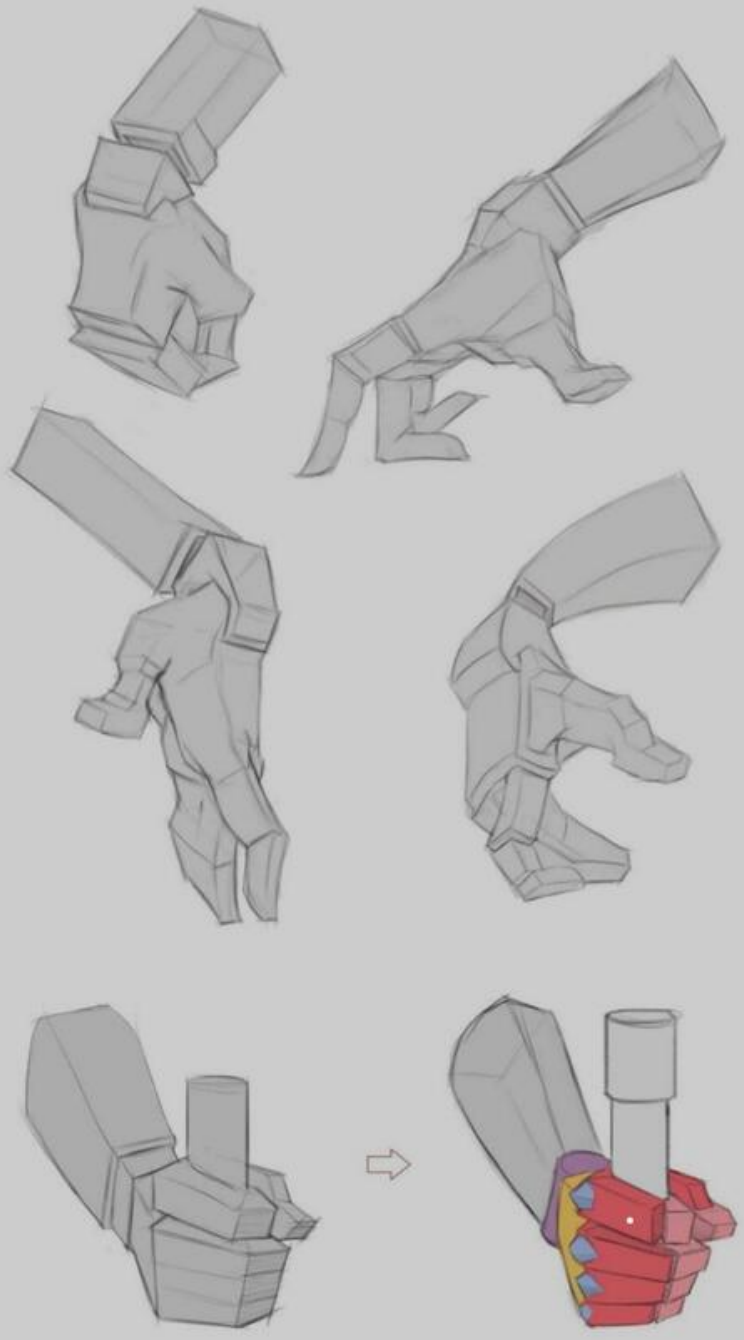


When the fingers are twisted, they will present a very beautiful arc. When drawing the dynamic trend of the hand, the fan-shaped structure can be used as an aid to make the drawn hand more tense.

production stop

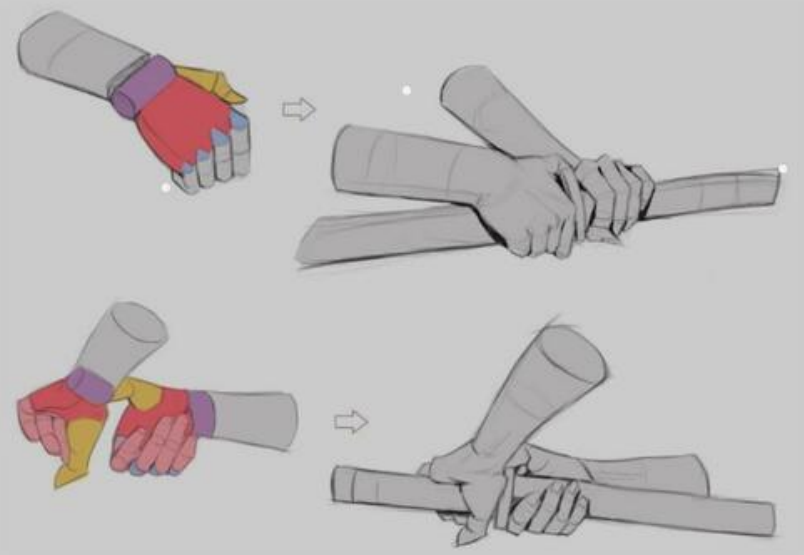


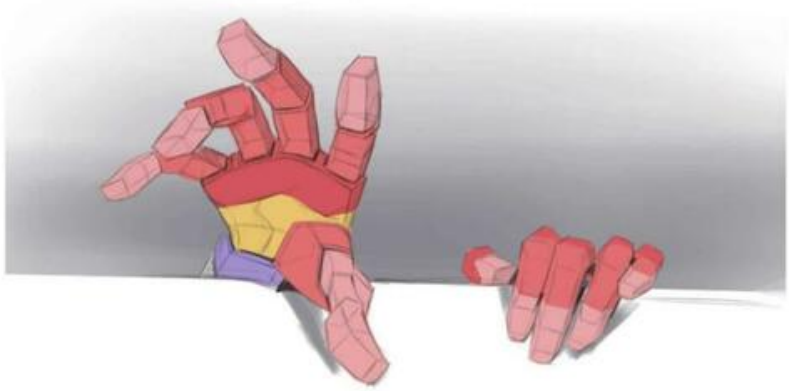
Dividing the movement of the hand into a combination of multiple geometric bodies helps to master the movement of the hand and at the same time take into account the three-dimensional sense of the hand.

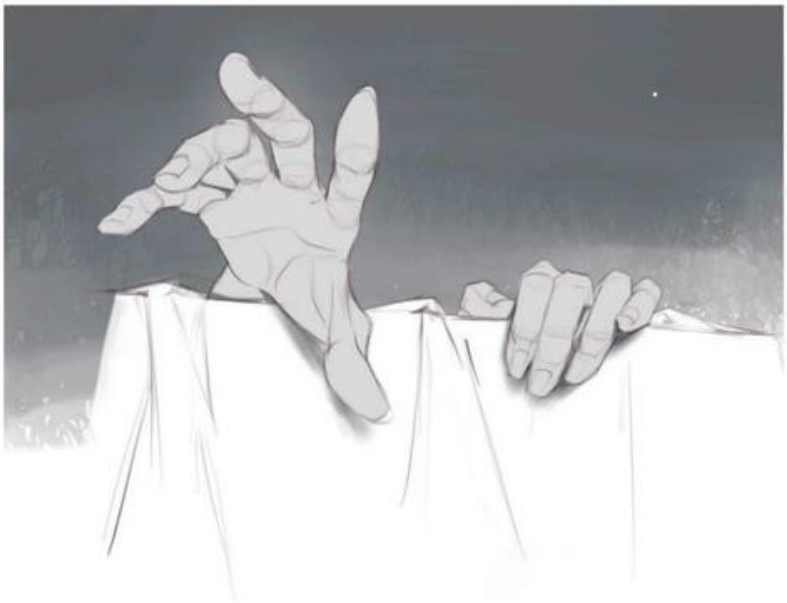


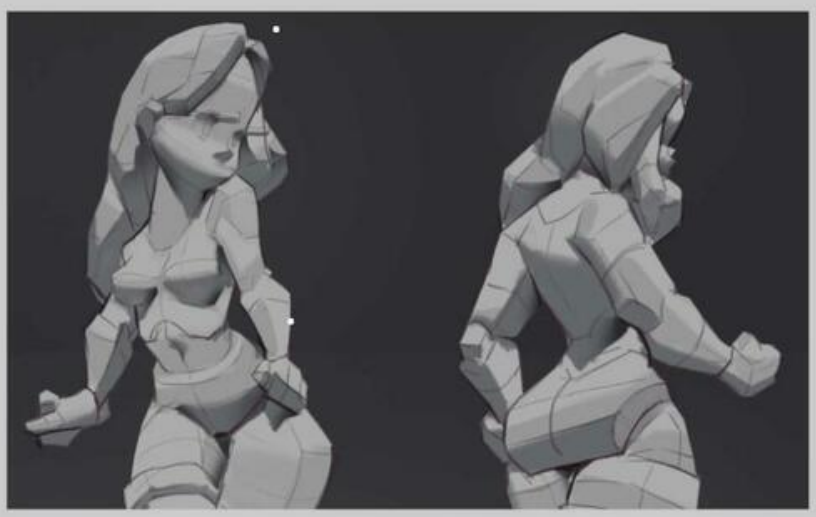
Due to the growth relationship of the knuckles, the palm presents a three-dimensional fan shape with radians.

An example of hand movements is as follows.









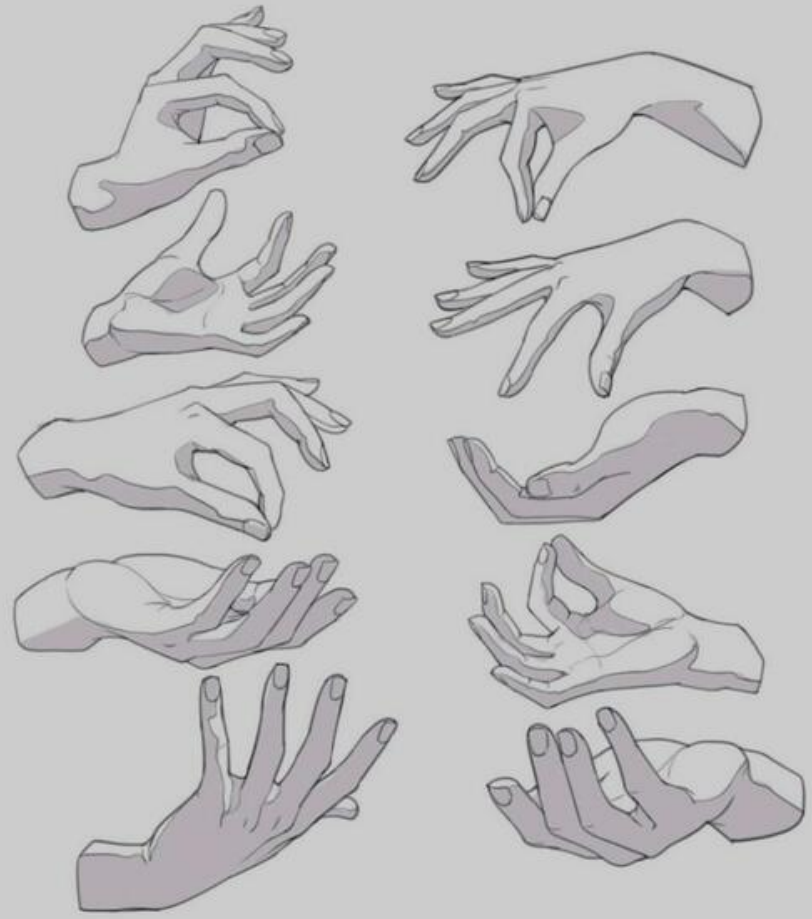
"hint

When expressing the hand under light and shadow conditions, it is necessary to express the light and shade as a whole, and to ensure

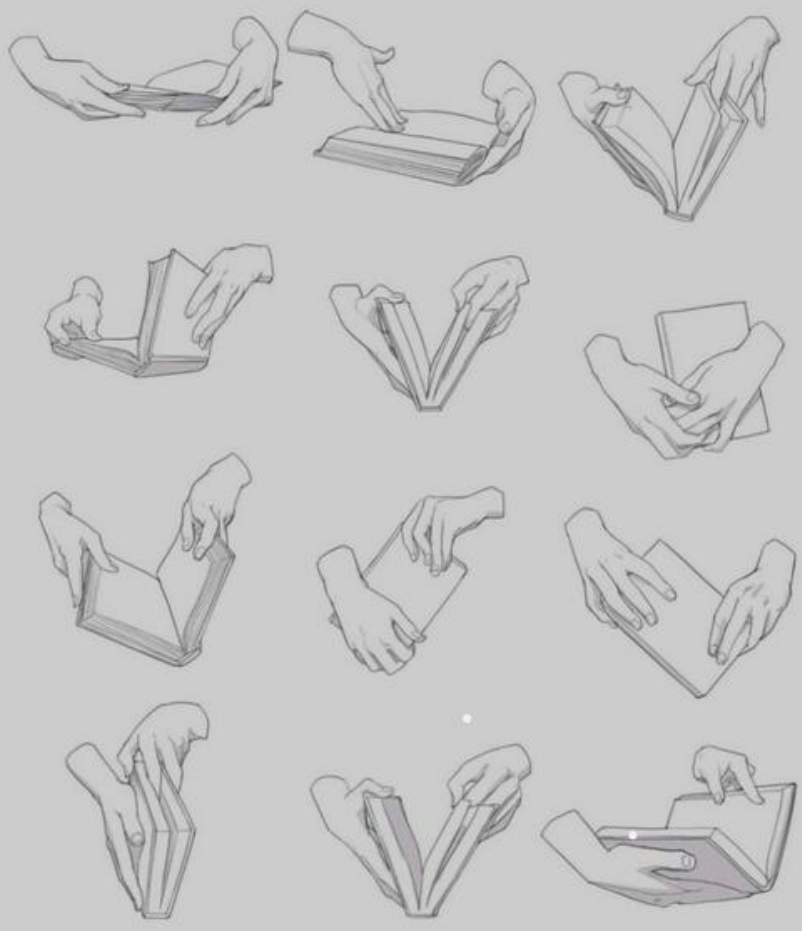
that the dark part is unified, do not let the dark part appear "flower", and do not only describe the light and dark relationship of a single finger.

More special training

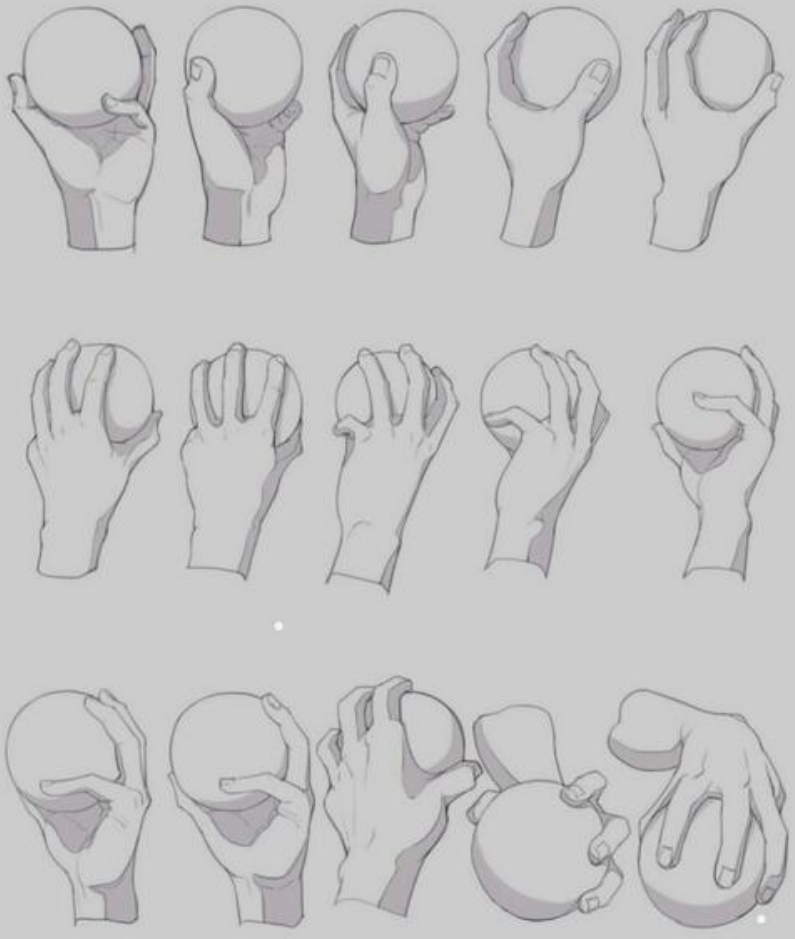
Practice a set of common gestures.



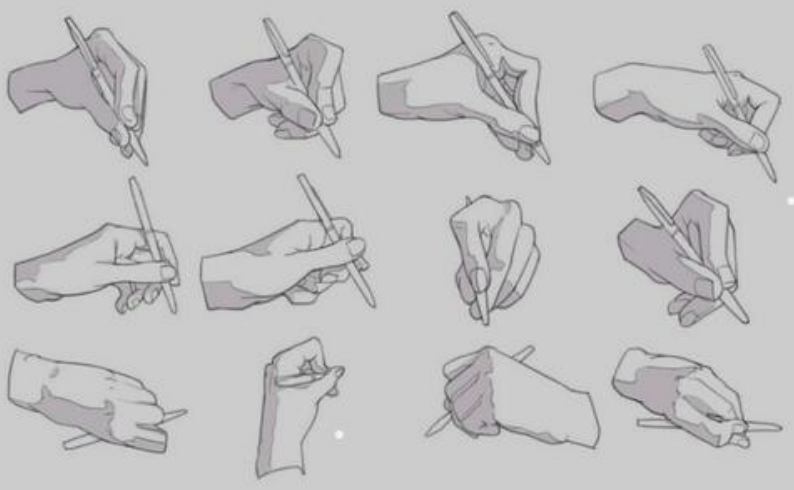
Do a set of hand flipping exercises.



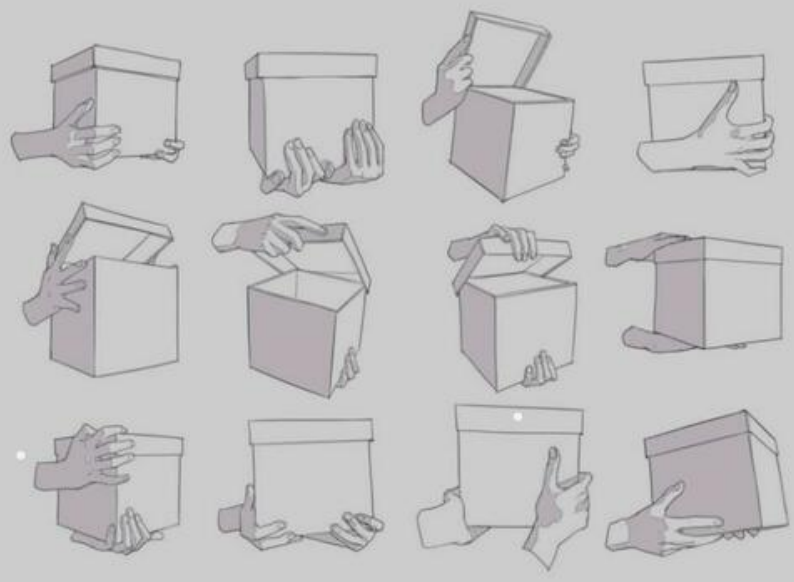
Do a set of ball grip exercises.



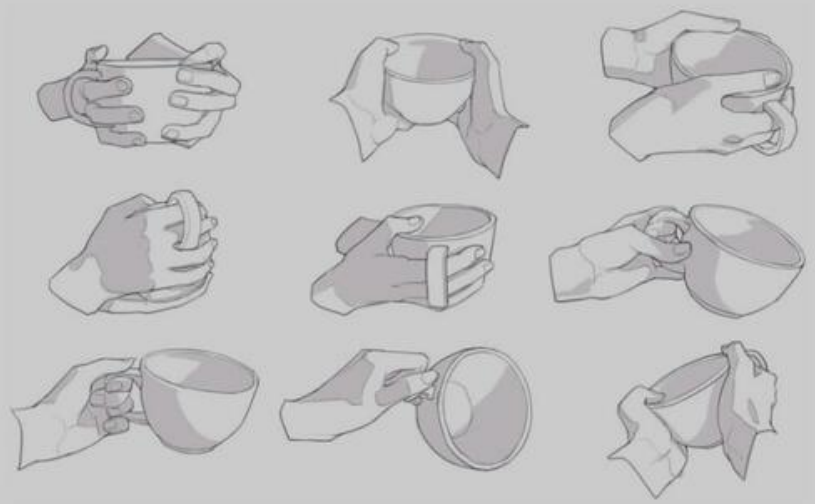
Do a set of pen-holding exercises.



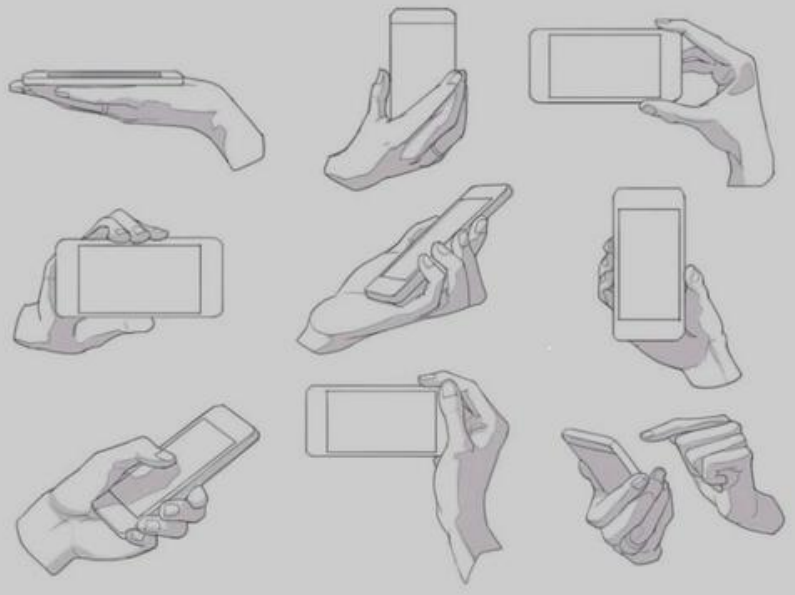
Do a set of exercises for holding a gift box.



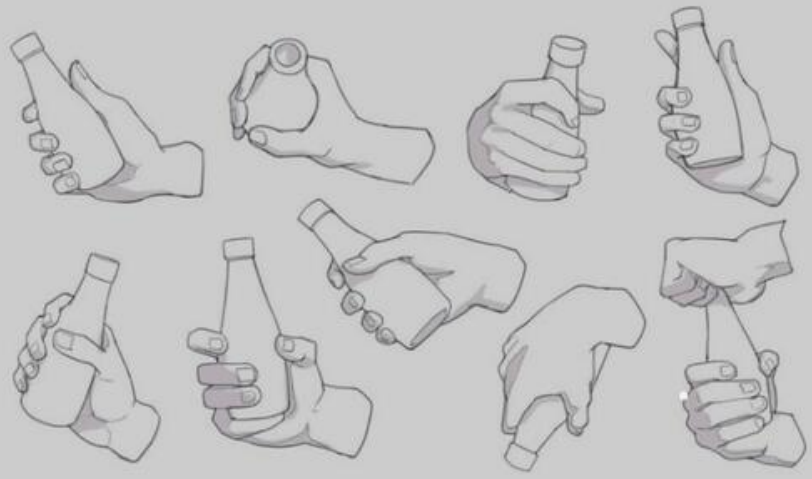
Do a set of exercises with the cup in hand.



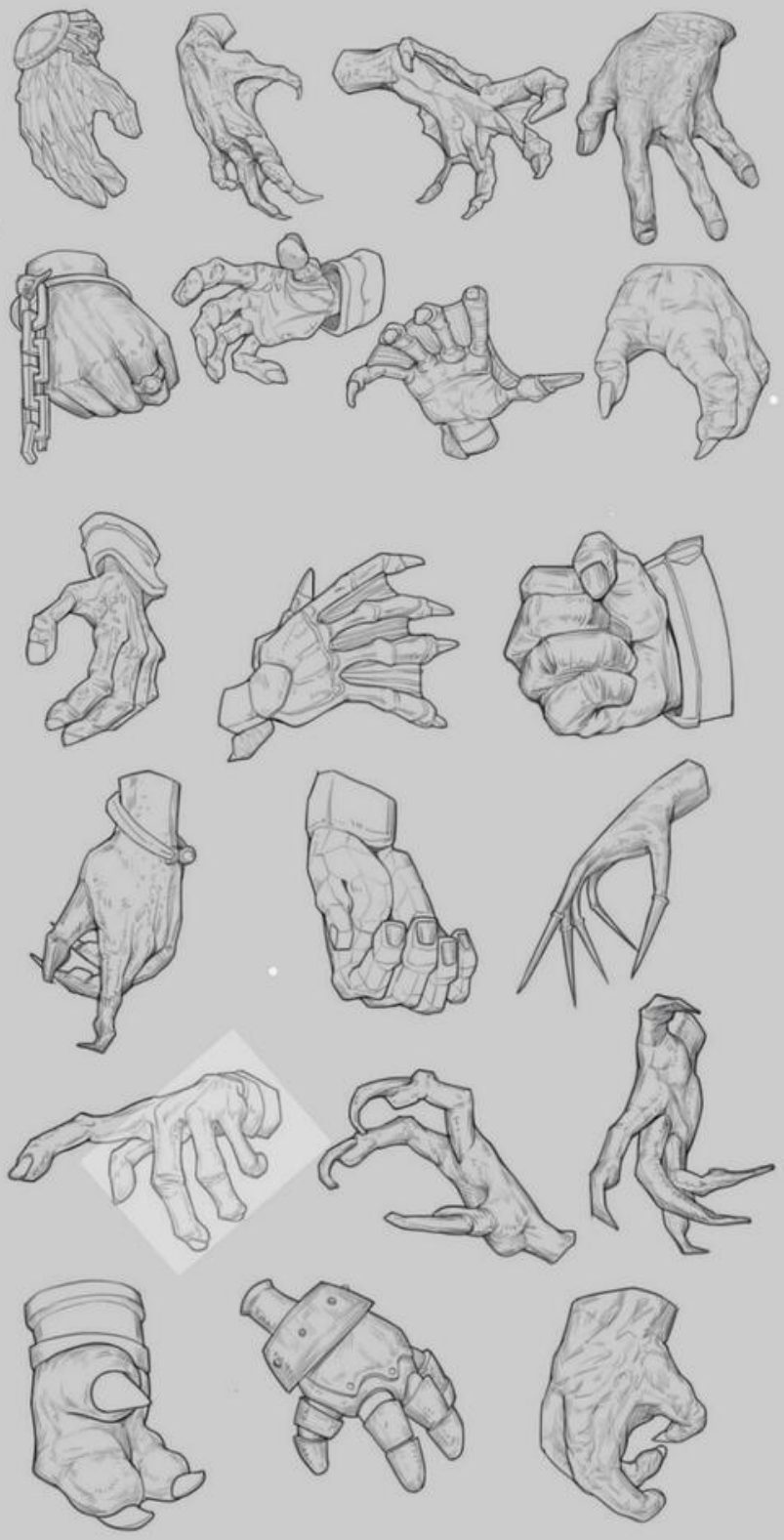
Do a set of exercises in holding the phone pose.



Do a set of exercises for holding a wine bottle.



Do a set of Orc Hand Form exercises.



Chapter 6 Special Foot Training

are When painting, the feet are the most easily overlooked place, especially the expression of the toes. Whether the feet drawn neatly or not depends on whether the structure of the toes is performed accurately and whether the combination is ingenious. This chapter covers everything from the structural proportions of the foot, to musculoskeletal performance, to the connections and torsion of the foot, and finally to showing the different dynamics of the foot.

6.1 Proportional structure of the foot

The structure of the foot is similar to that of the hand, and by understanding the proportions and structure of the foot, a knowledge of the foot can be quickly established.

6.1.1 Scale

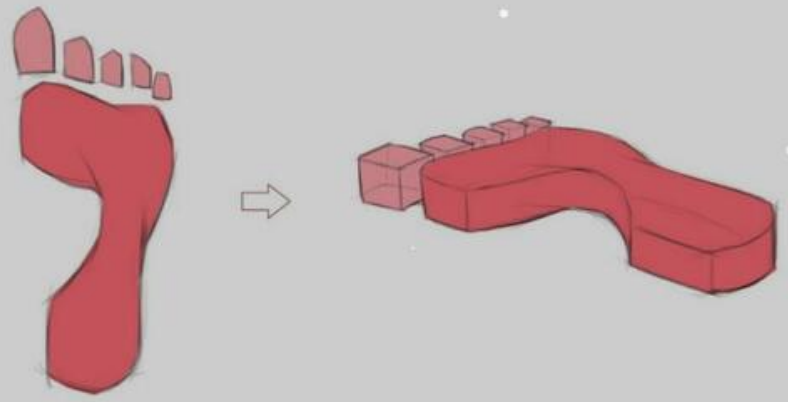
From the ankle, the height and length of the foot are approximately 1:2 laterally, and the width of the foot and heel when viewed from the front is approximately 1:2.

The lateral foot is divided into three parts horizontally: toes, soles and heels, with a length ratio of 3:52. The lateral foot is divided into two parts vertically: toes and instep, with a height ratio of 2:3.

6.1.2 Structure

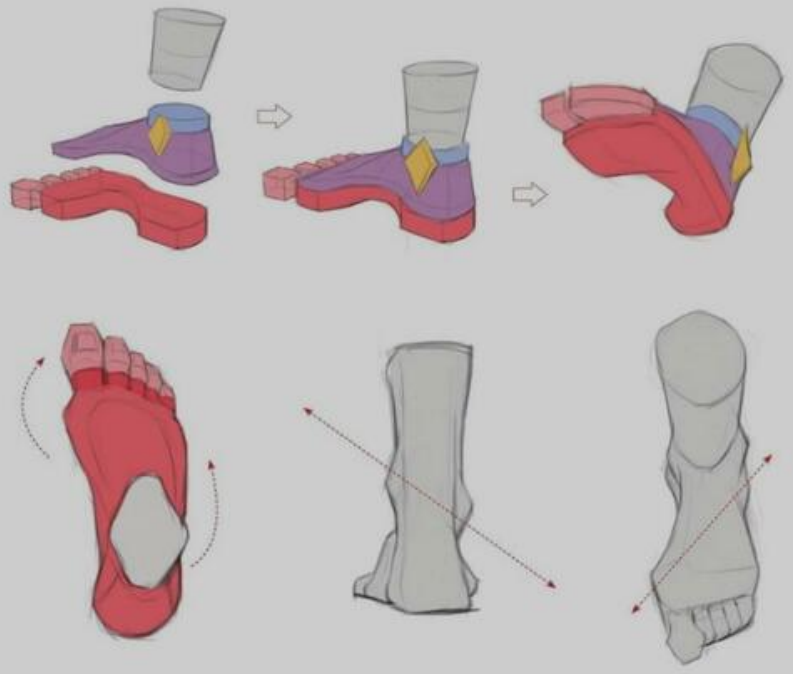
For ease of understanding, the foot can be divided into the ball of the foot, the toes, the dorsum, and the calf that connects with the foot. Before drawing, build a bottom view of the foot, and then draw the corresponding

thickness of.



Then draw the back of the foot, The calf and ankle sections, so that the full shape of the foot can be shown

.



|Tips

The front and bottom surfaces of the foot are not symmetrical, the inside of the ankle is higher than the outside of the ankle, that is, the side of the big toe is higher than the side of the little toe. Only by knowing the difference between the heights and the lowness of these places can

Can show good foot movement.

6.2 Influence of Foot Bones and Muscles on Surface Performance

This section examines the effects of the bones and muscles of the foot on the body surface. When painting, remember

Recall the impact of key prominent bone points and stretches of important muscles on the shape of the foot.

6.2.1 Influence of foot skeleton on body surface performance

If you look closely at the picture below, you can see that the soles of the feet are longer than the palms, and the toes are shorter

than the fingers. Foot movement mainly depends on the movement of the ankle, so it is easier to express foot movement than the hand.

The comparison between the foot bones and the foot contour is shown below. It can be seen that the heel and the front end of

the foot cover less muscle and fat, and the front end of the foot is the main support point when the foot touches the ground.

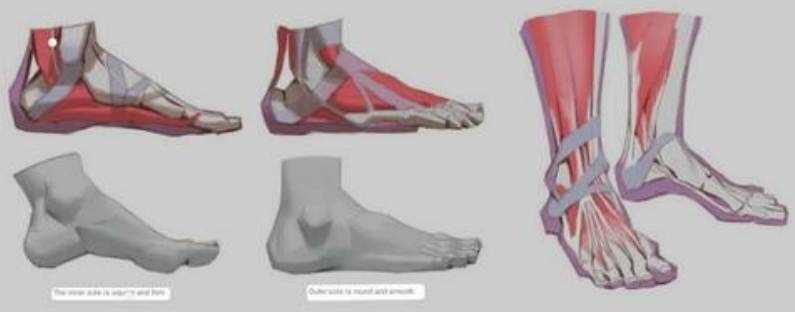
6.2.2 Influence of Foot Muscles on Body Surface Performance

Viewed from the outside of the foot, the sole of the foot is more square and stiff due to the undulating bone

Lang's form.

structure. Viewed from the inside of the foot, the sole of the foot is rounded and smooth due to more muscles covered.

form.

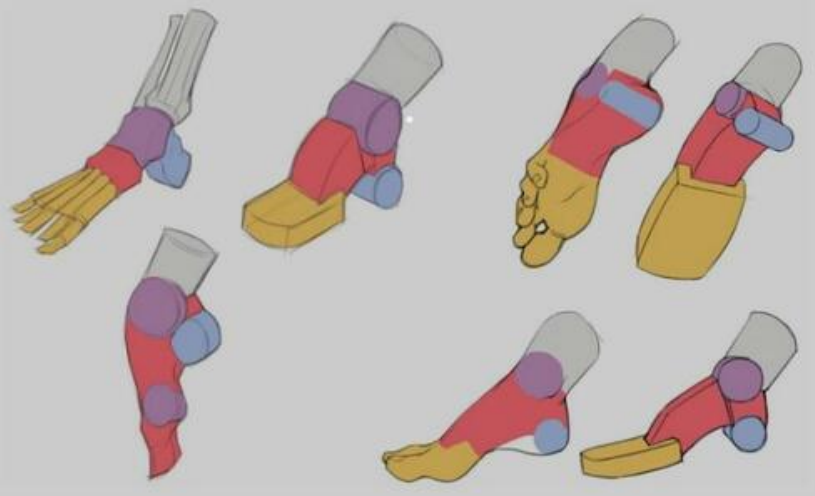


The effect of muscle attachment to bone on the body surface is illustrated below.

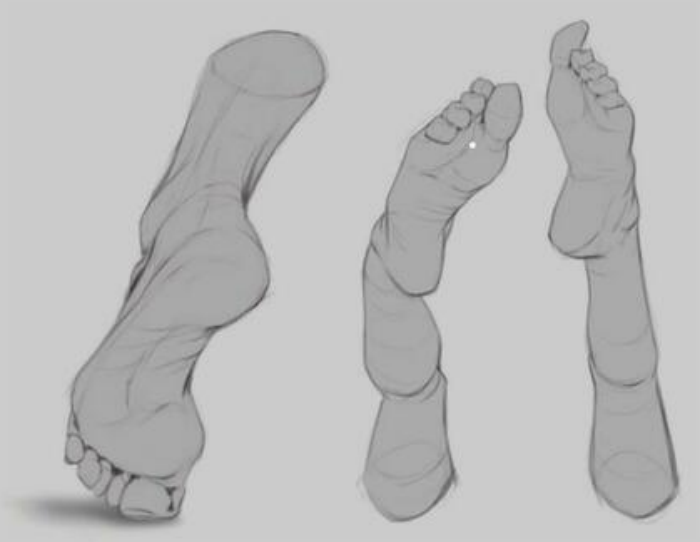
6.3 The connection of the foot

The connection of the foot includes the connection at the ankle and the connection at the toes. The range of motion of the ankle is large, and the range of motion of the toes is small. If you want to draw the foot vividly, it is necessary to show the connection relationship of the foot.

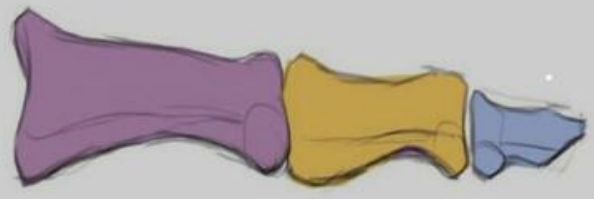
Next, the structure of the foot is dynamically spliced to help understand the connection law of the foot. Think of the ankle as an axis of rotation and the toes as a unified whole.

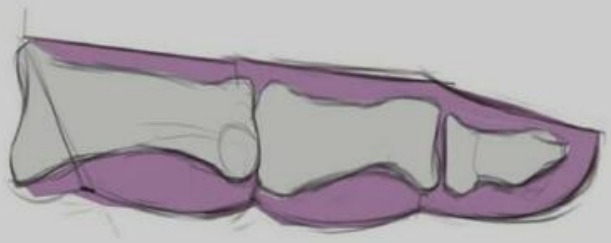


The range of motion of the ankle is larger up and down, and the range of motion left and right is smaller.



The connection at the toes is similar to that at the fingers, except that the toe joints are shorter.





6.4 Foot twist and dynamic performance

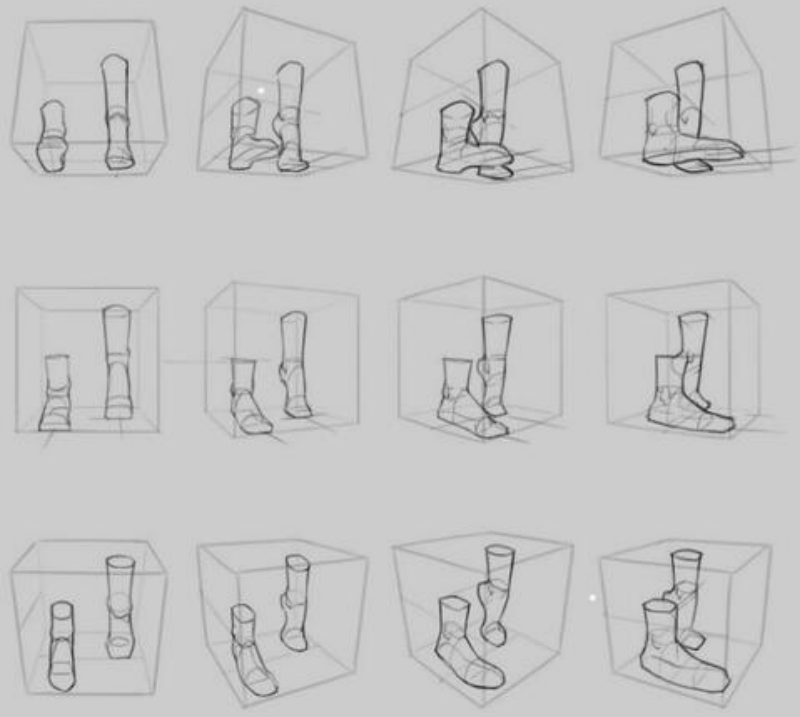
Among the many illustrations, the number of times the feet appear in the picture is not very large. But even so, we must at least have an understanding of how the feet twist and move with the legs, so as to better improve the overall level of the picture.

6.4.1 Torsion of the foot

In order to accurately represent the various angular relationships of the feet, it is necessary to first establish the empty space of the cube.

between.

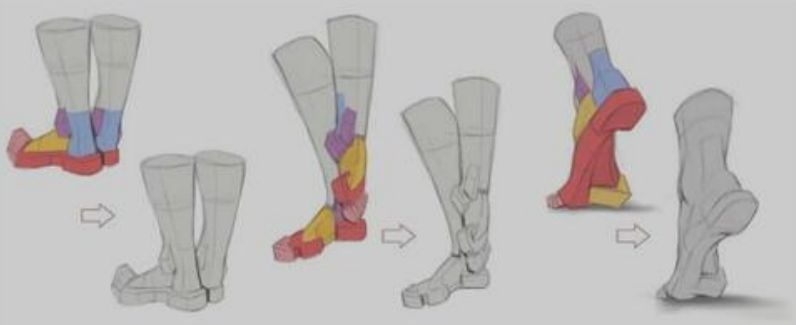
The approximate position and structure of the dynamic performance of the foot are drawn in the cube space, as shown in the figure below.

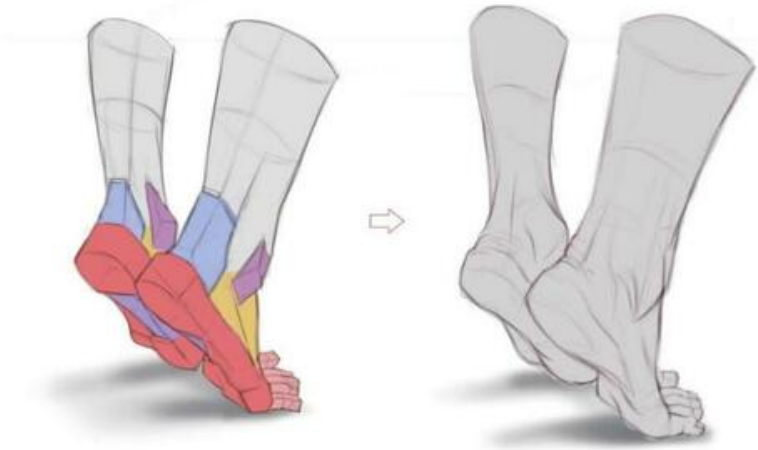


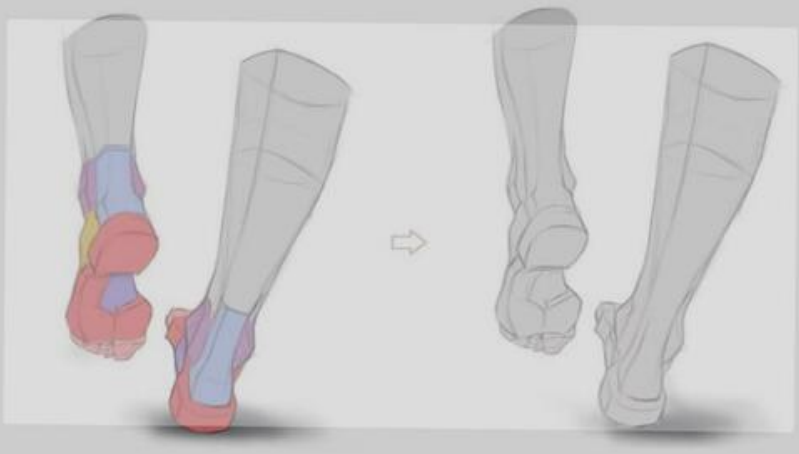
According to the general structure, refine the outline of the foot under the influence of bones and muscles, as shown in the figure below.

6.4.2 Dynamic performance of the foot

When expressing foot dynamics, attention should be paid to the structural interspersed relationship and the range of motion. The toes are often the key to expressing details in painting.





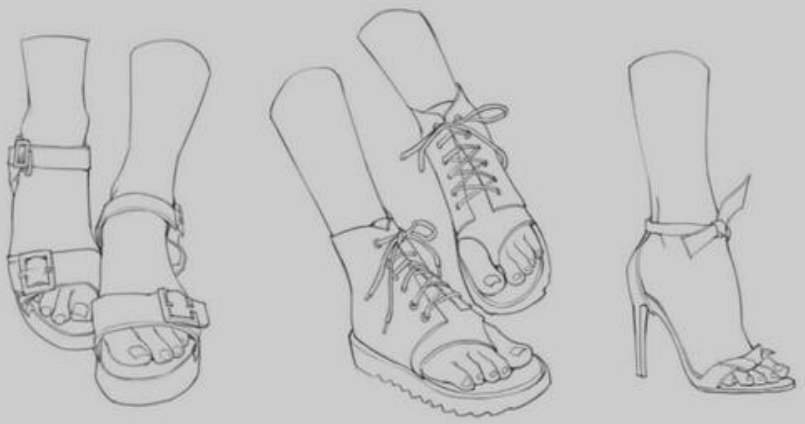


More special training

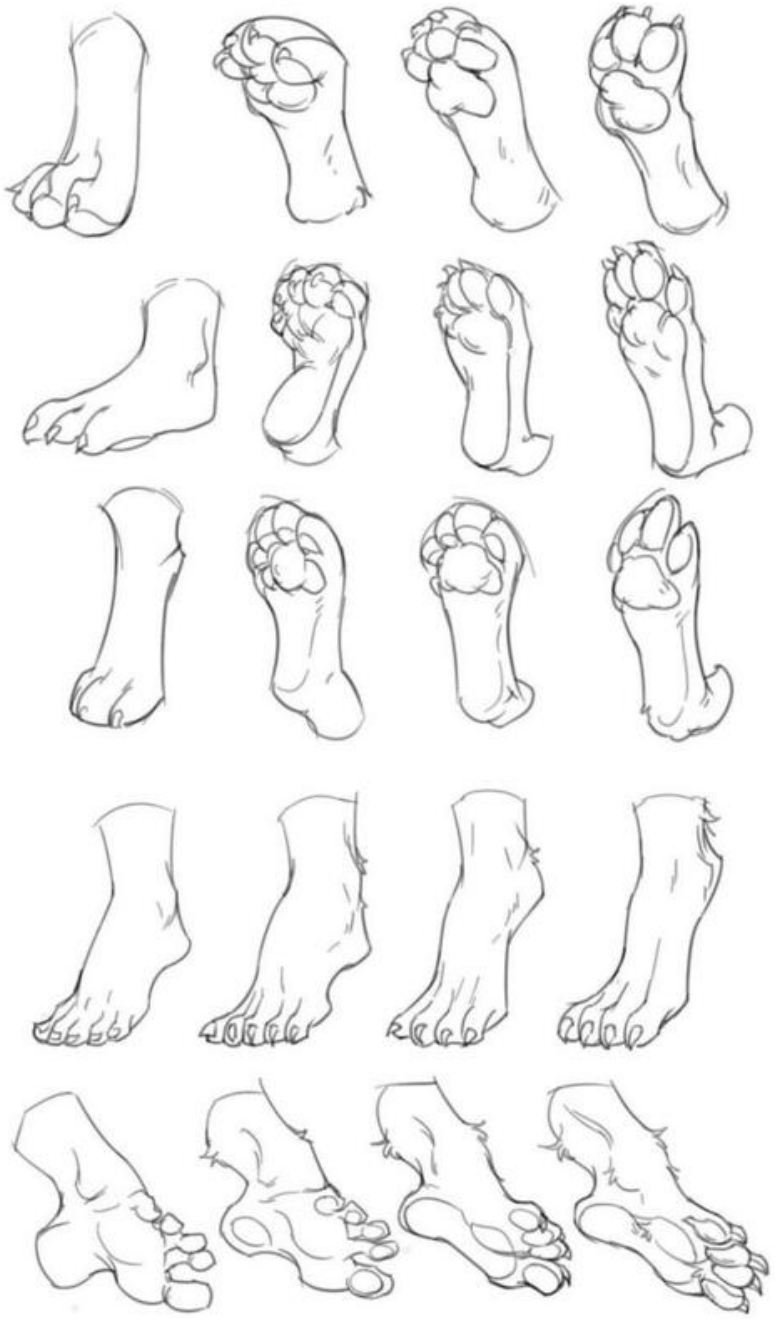
Do a set of single-footed exercises.

Do a set of bipedal exercises.

Do a set of foot exercises with shoes on.



Do a set of animal foot exercises.



Chapter 7 Dynamic Special Training

Through the previous study, we understand the structure of the human body. This chapter focuses on explaining human body shape, the human body's rotation in space and the performance of human body dynamics. It mainly solves the problems of beginners who dare not exaggerate and deform when drawing the human body, and the drawing is too flat, which will lay the foundation for subsequent character modeling. Base.

7.1 people's body type

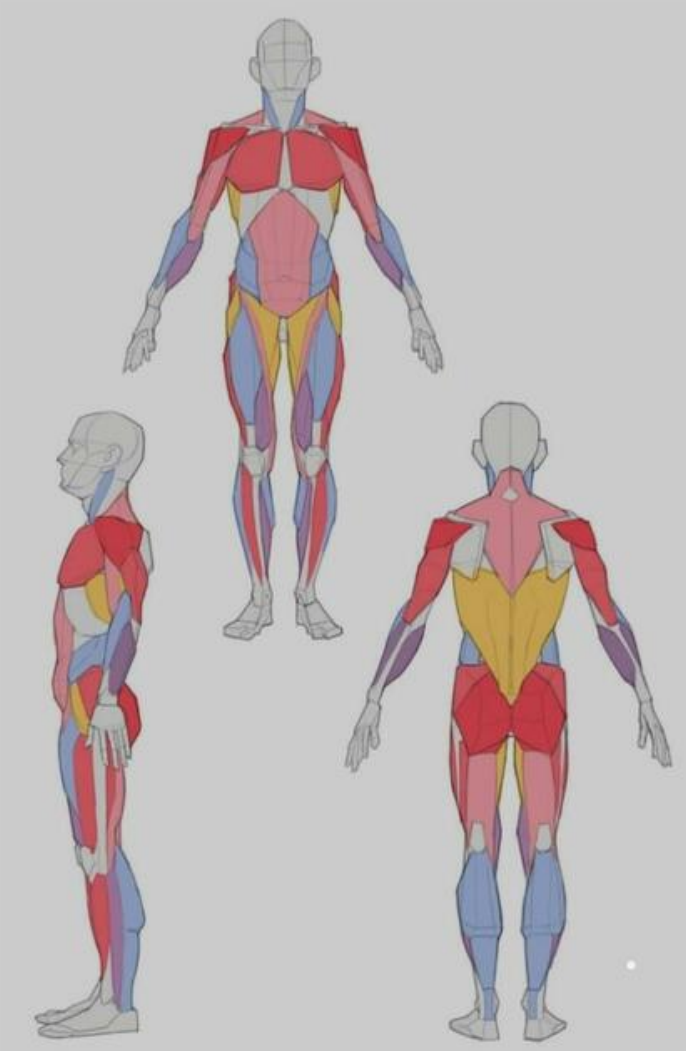
Human body size is very important for character design. People with different occupations have different body types. For example, according to the character setting of a game, the physique of the warrior is burly and strong, the physique of the mage is thin and slender, and the physique of the assassin is strong and agile. In addition to occupational characteristics that affect the character's body shape, the age and gender of the character will also affect the body shape.

7.1.1 Normal body type

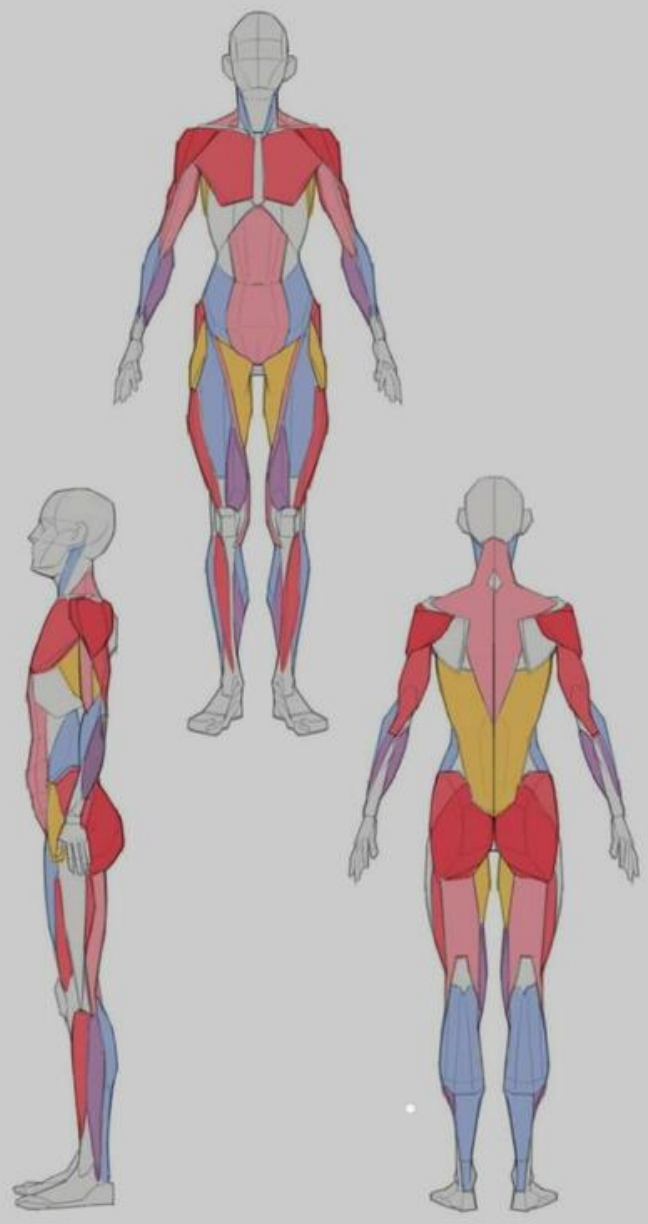
Usually the average person is 7.5 heads and body, but in artistic creation, in order to pursue the effect of the picture, sometimes the male is set to 8 heads and the female is set to 7.5 heads.

Many people think that males are taller and have an obvious head-to-body ratio advantage. But why do people think that women are taller at the same height in real life? Aside from the influence of high heels, the height of women is mainly related to the difference in body shape between men and women. Looking at the picture below, we can see that the male waist is not very obvious, while the female waist is more upper and more obvious. The upper waist will make the legs look longer, the ratio of male legs to torso is 5:5, and the ratio of female legs to torso is 4:6, so women appear taller.

The same principle, in the game design, the figure of the warrior and other characters will be set with a ratio of 5:5, which will make the character more stable and reliable; while the human body ratio of characters such as assassins and mages may be 4:6 or 3:7, this will make the character look slimmer and taller.



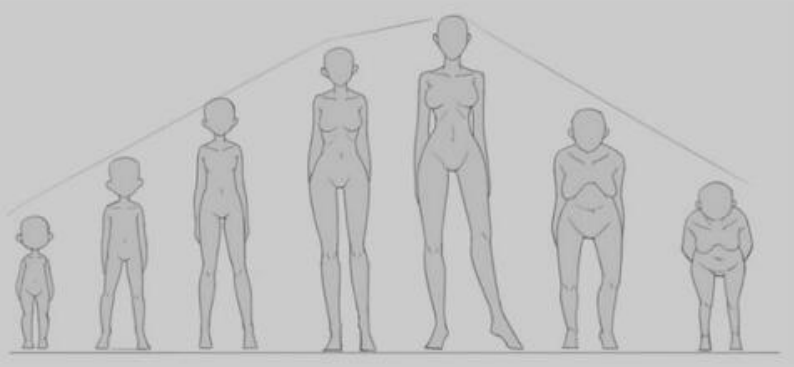
male



Woman

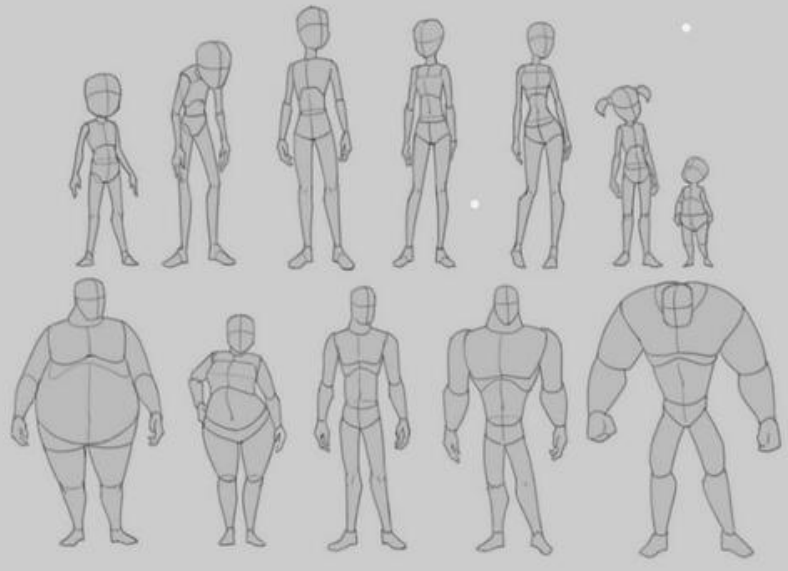
In addition to gender effects, the body size of the human body also changes with age, mainly in the ratio of upper and lower body, and the size of the head. Children with short legs and heads look cute, adults with long heads and calves will be more in line with public aesthetics, and elderly people will appear short because of their hunched backs. Based on these properties, we can practice representing the body of the same person at different ages

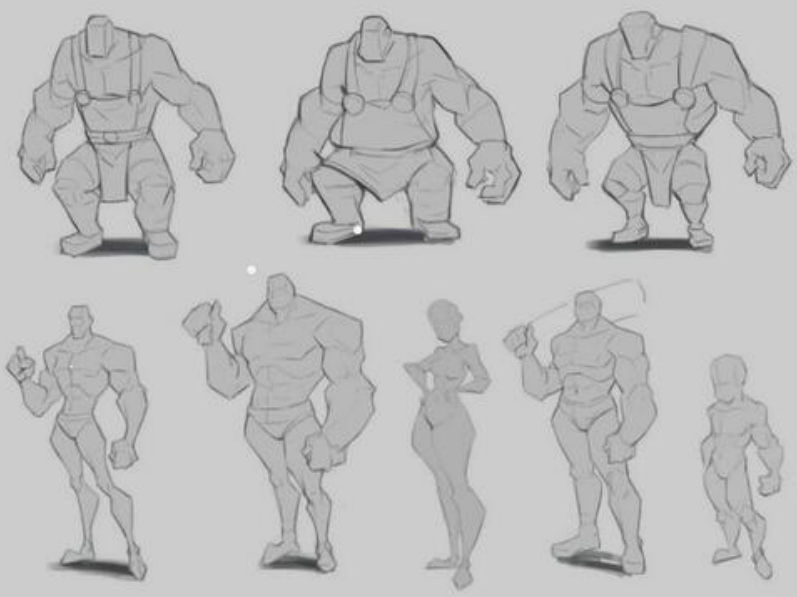
type.



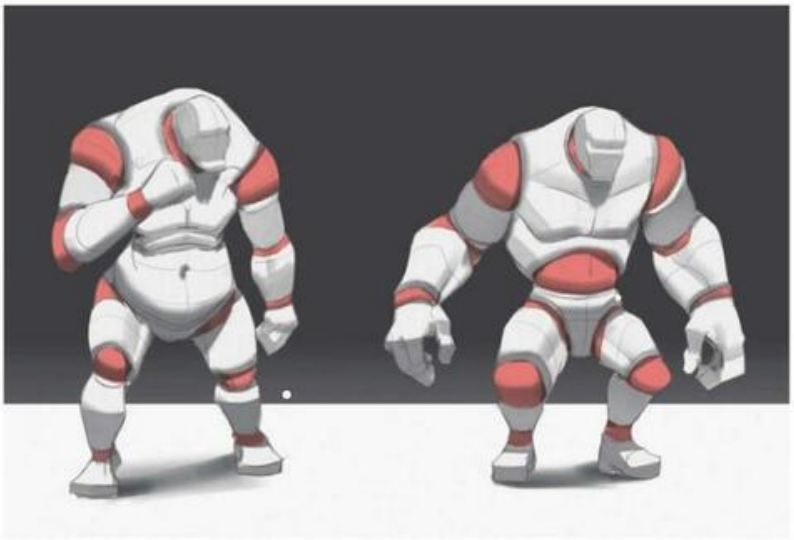
7.1.2 Exaggerated body shape

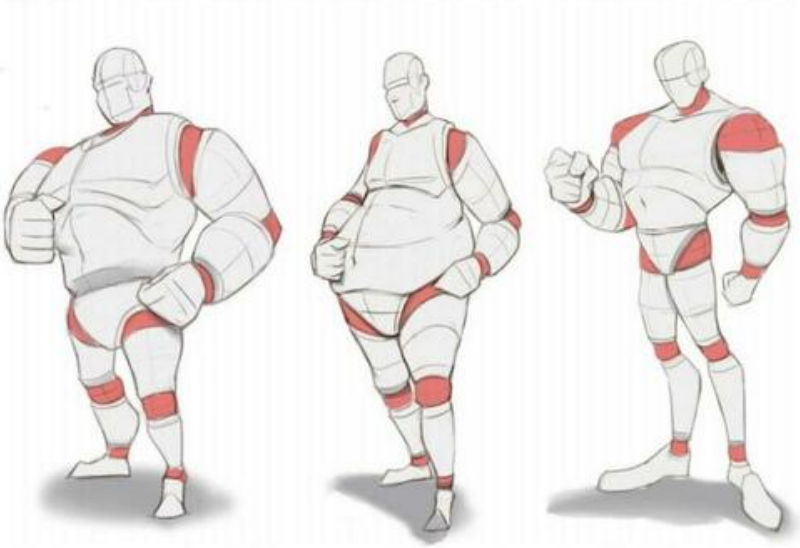
In addition to normal body types, we can also see different types of human bodies represented in exaggerated ways in many animation works.

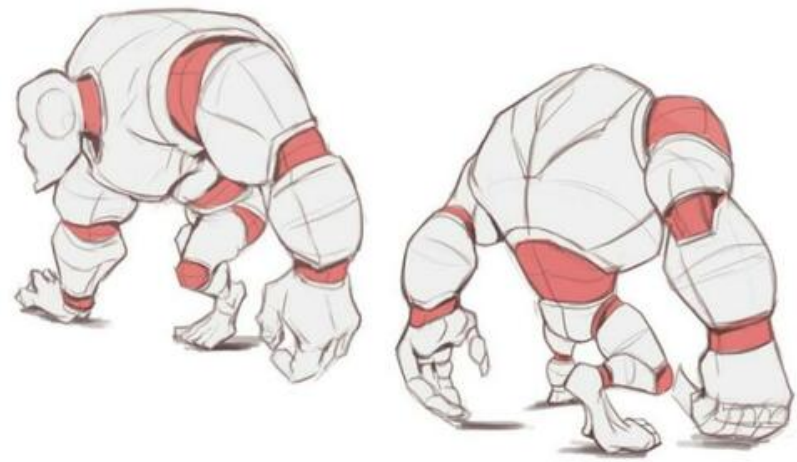




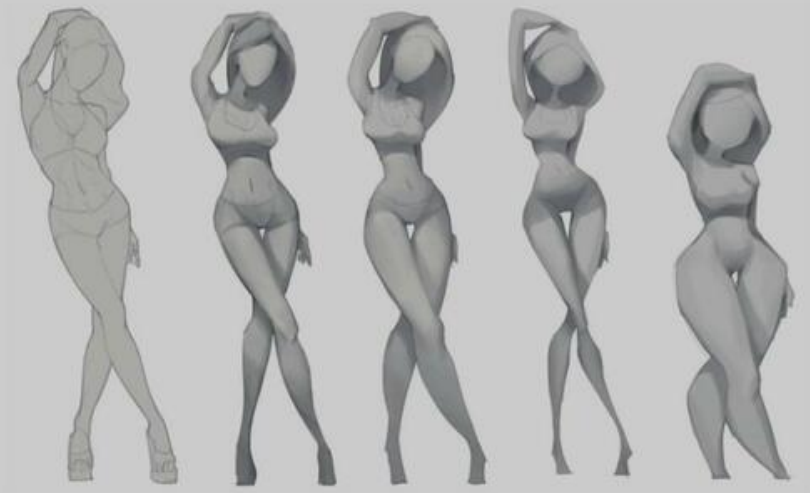
Note that the exaggeration mentioned here is usually aimed at a certain part of the human body, such as the stomach, crotch, waist or arms, etc., and these exaggerated parts will be in sharp contrast with other parts, such exaggeration is meaningful. If all parts are exaggerated, the drawn human form will have no character.





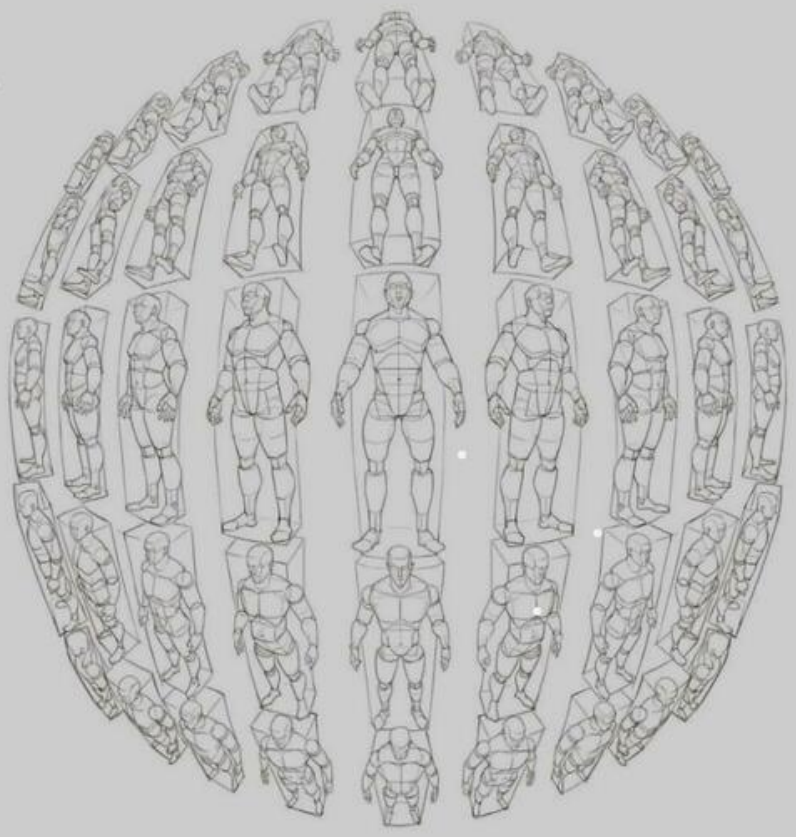


Next, try to show the different body types of the same person. You can choose to refer to the photo to express the different body types of the person by strengthening and exaggerating a certain part of the person in the photo.



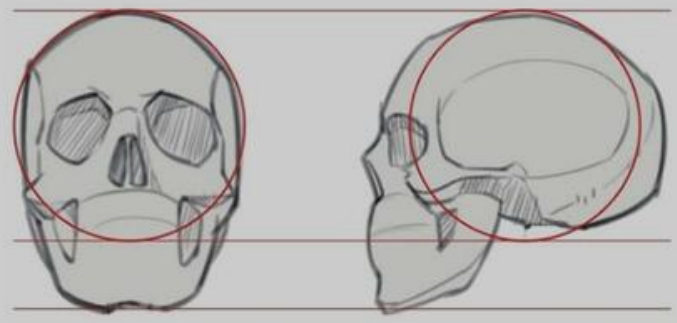
7.2 Body mass exercises

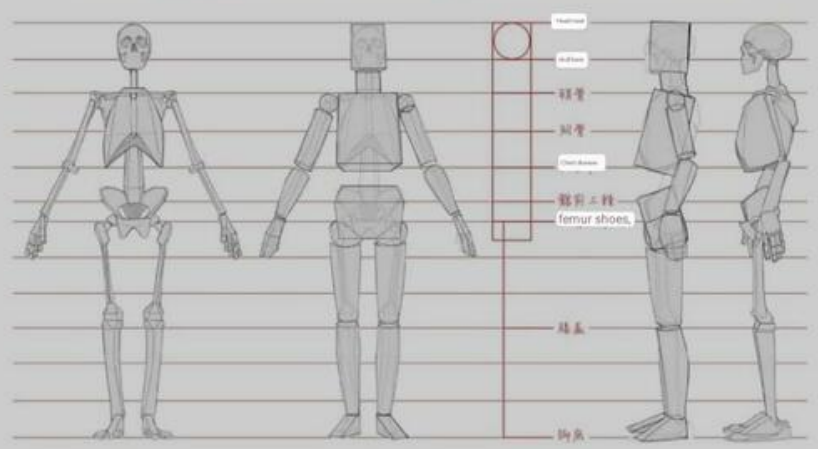
The practice of human body blocks is the basis for drawing the human body, and it helps to solve the problems of the accuracy of proportion, perspective and space when drawing the human body.



7.2.1 Proportion and Spatial Position of Human Body Mass

The bones of the human body can be classified into blocks, and the proportion of the blocks represents the proportion of the bones. When drawing human blocks from different angles, pay attention to the proportion and perspective of the blocks. The head and skull are summarized into a circle, and the whole human body can be measured by using this circle as a unit. proportional relationship.

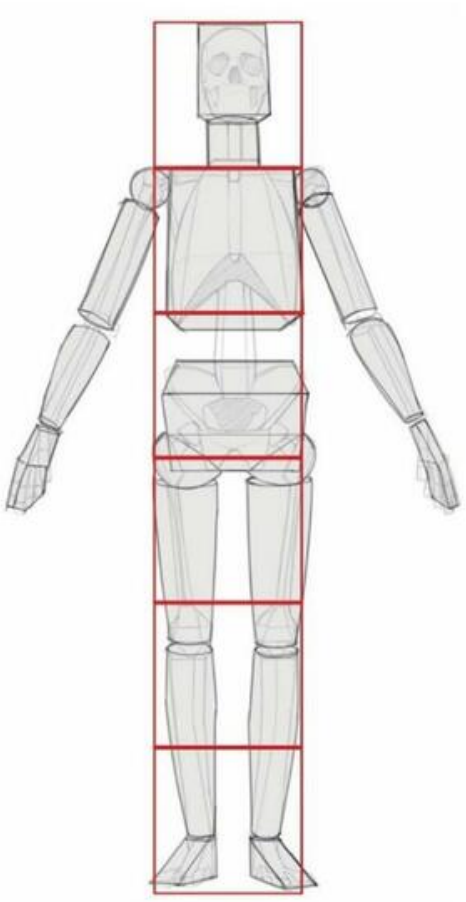


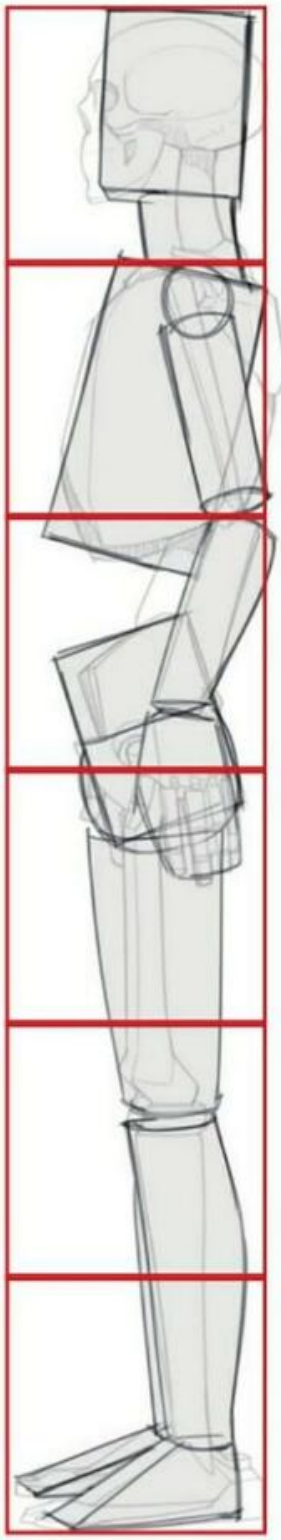


Knowing the proportions of the front and side body mass, you can put the human body mass into the space and draw its spatial position.

After memorizing the proportion of human body mass, you can place the body mass representing the human torso into an equal square

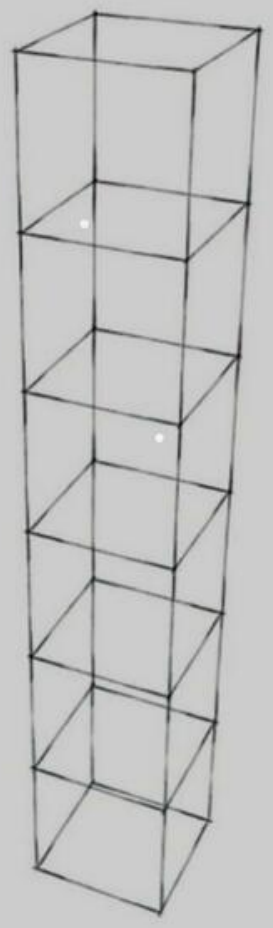
In order to determine the spatial position of the human body block.

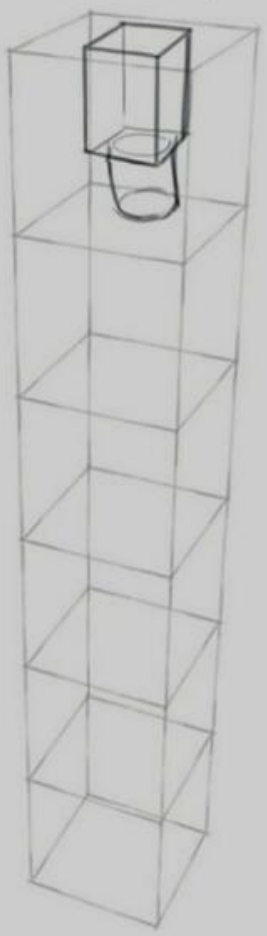


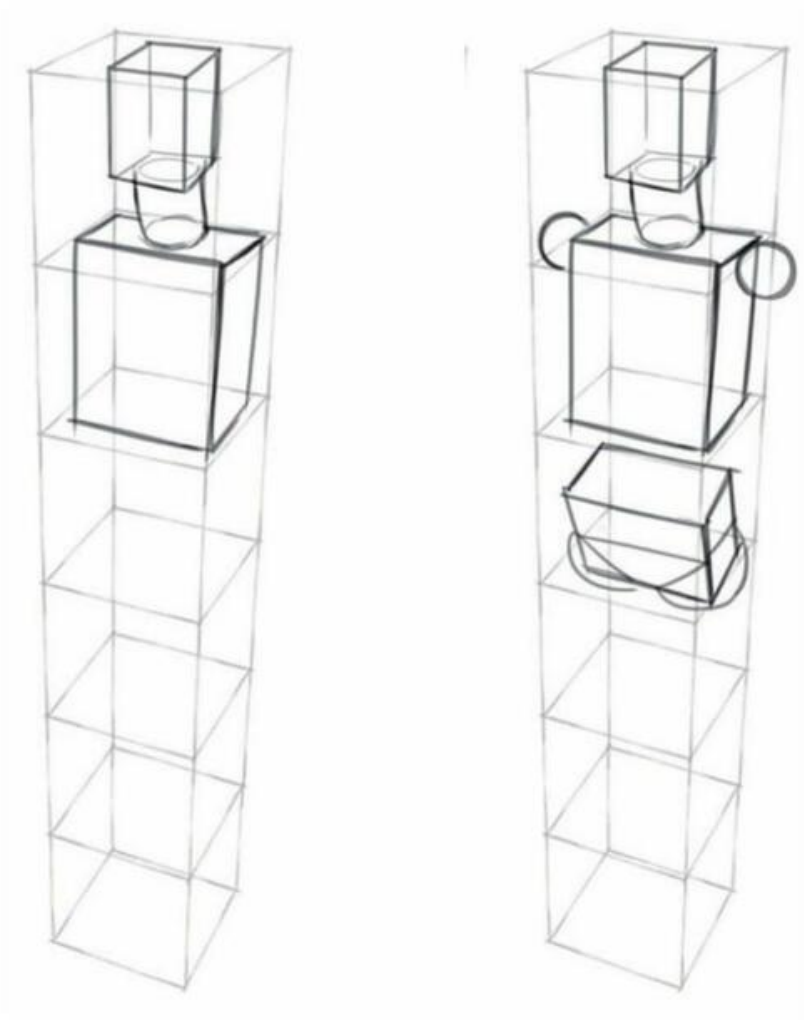


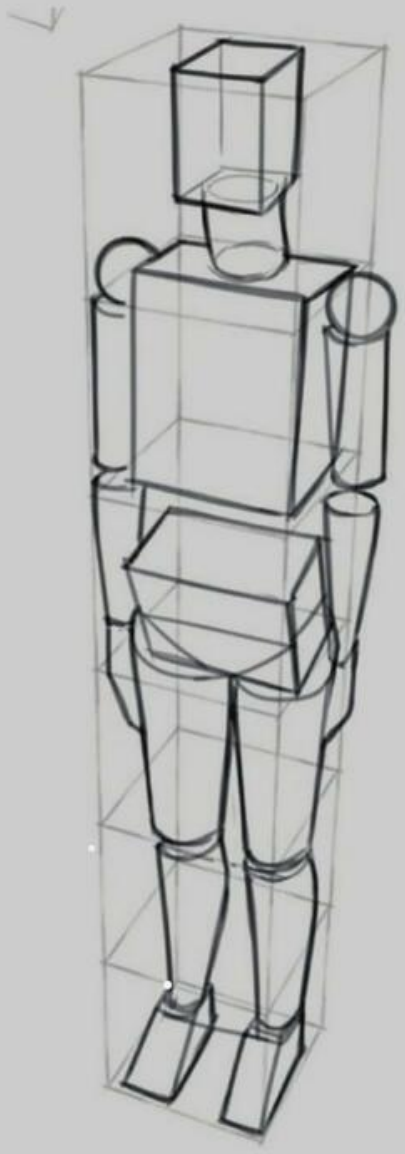
Draw 6 equal cubes with different angles of cuboids.

Put the generalized body block into the drawn cuboid frame.





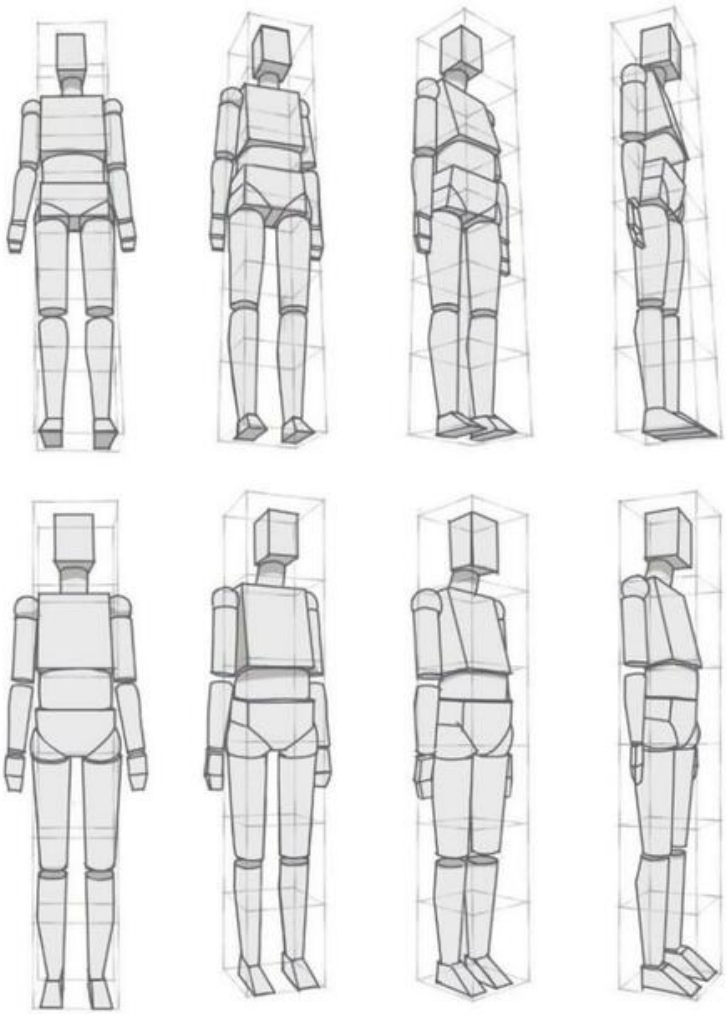


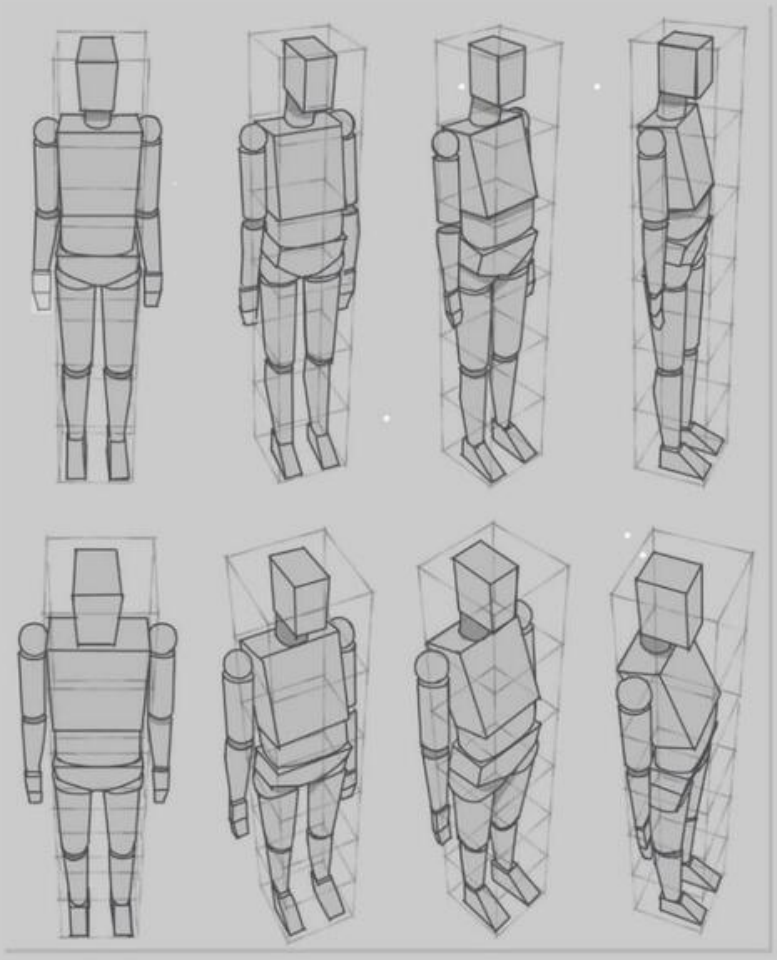


hint

Measure the body mass one by one before placing it in the frame and adjust accordingly

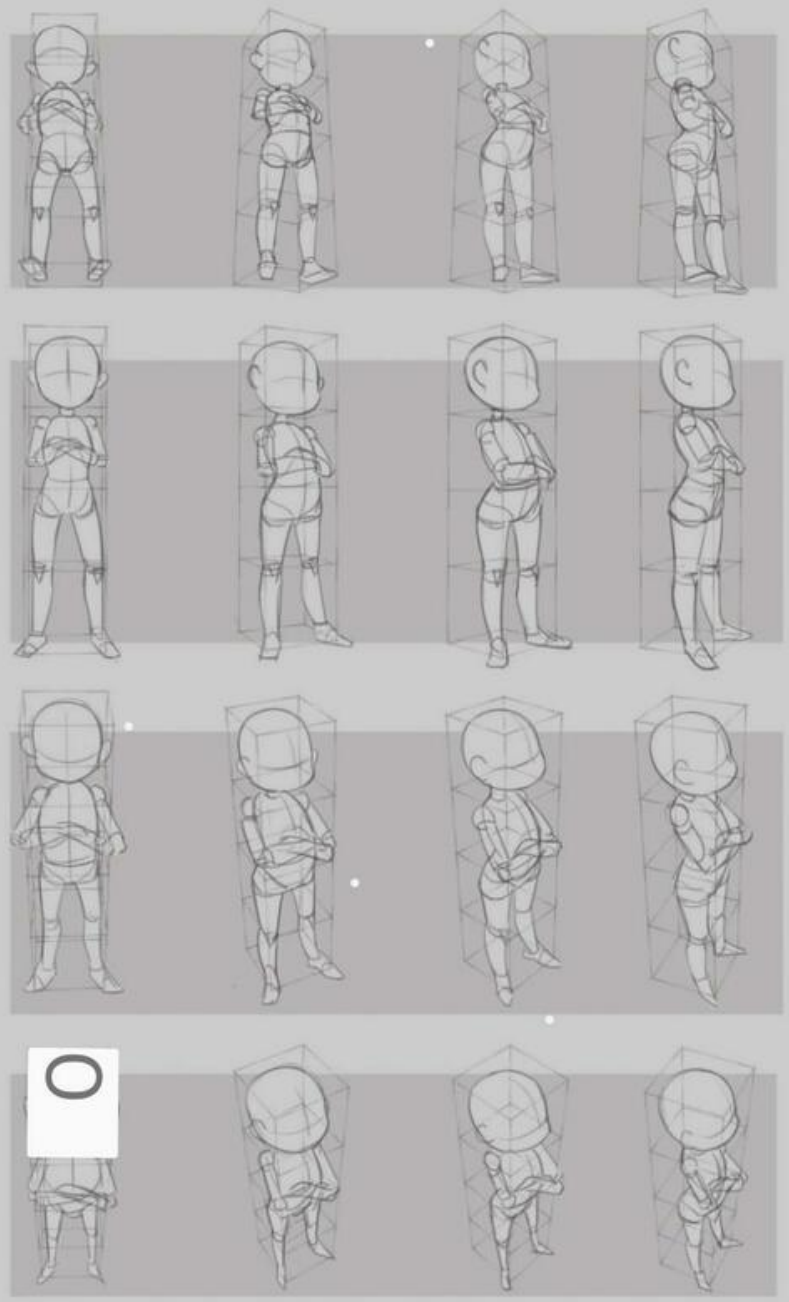
The perspective angle and position of the body mass.

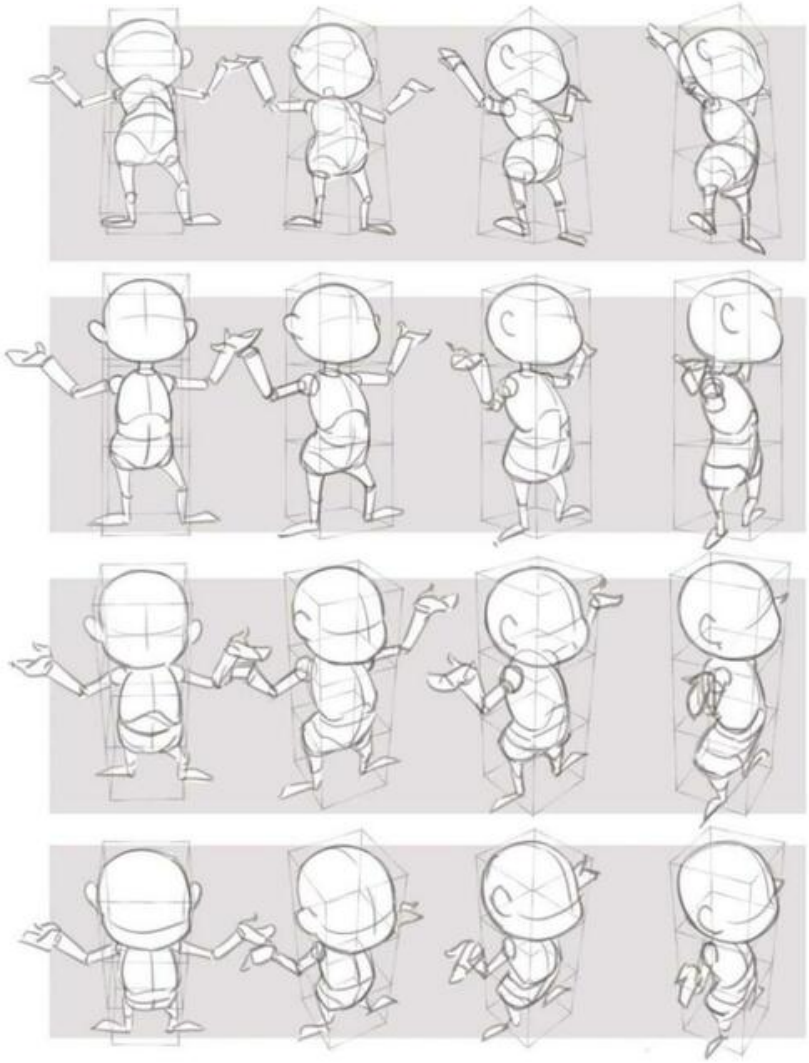


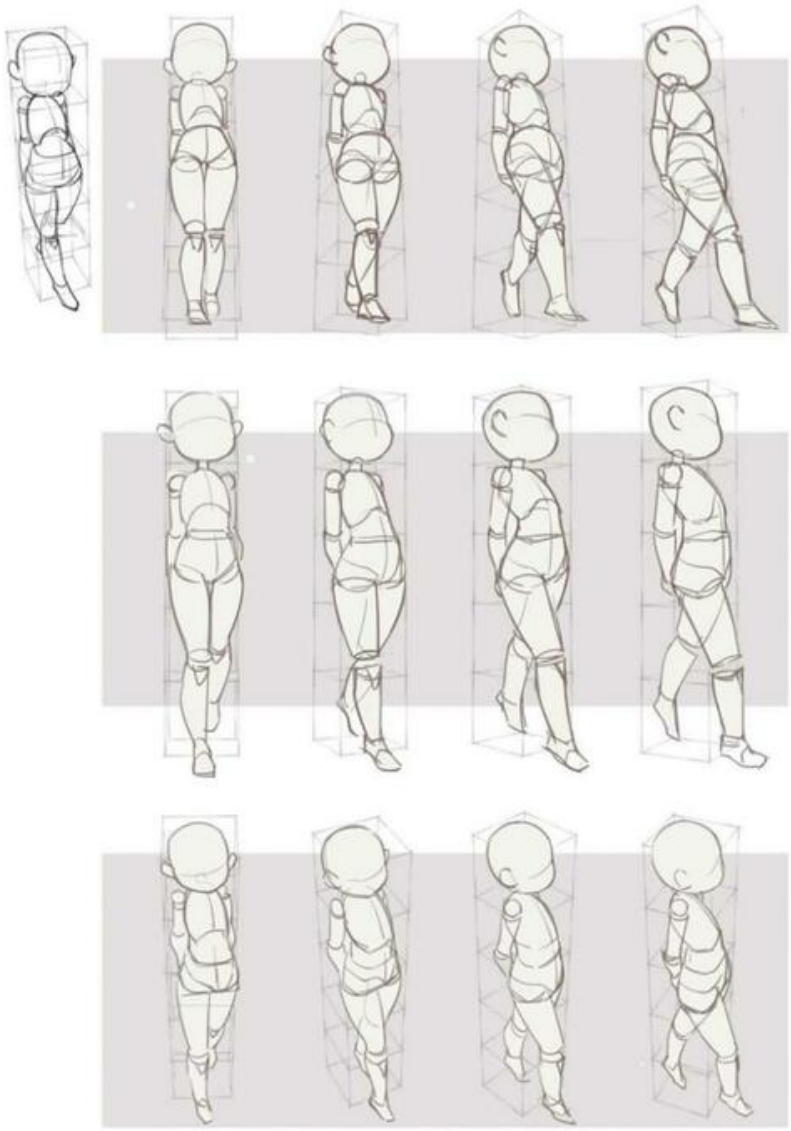


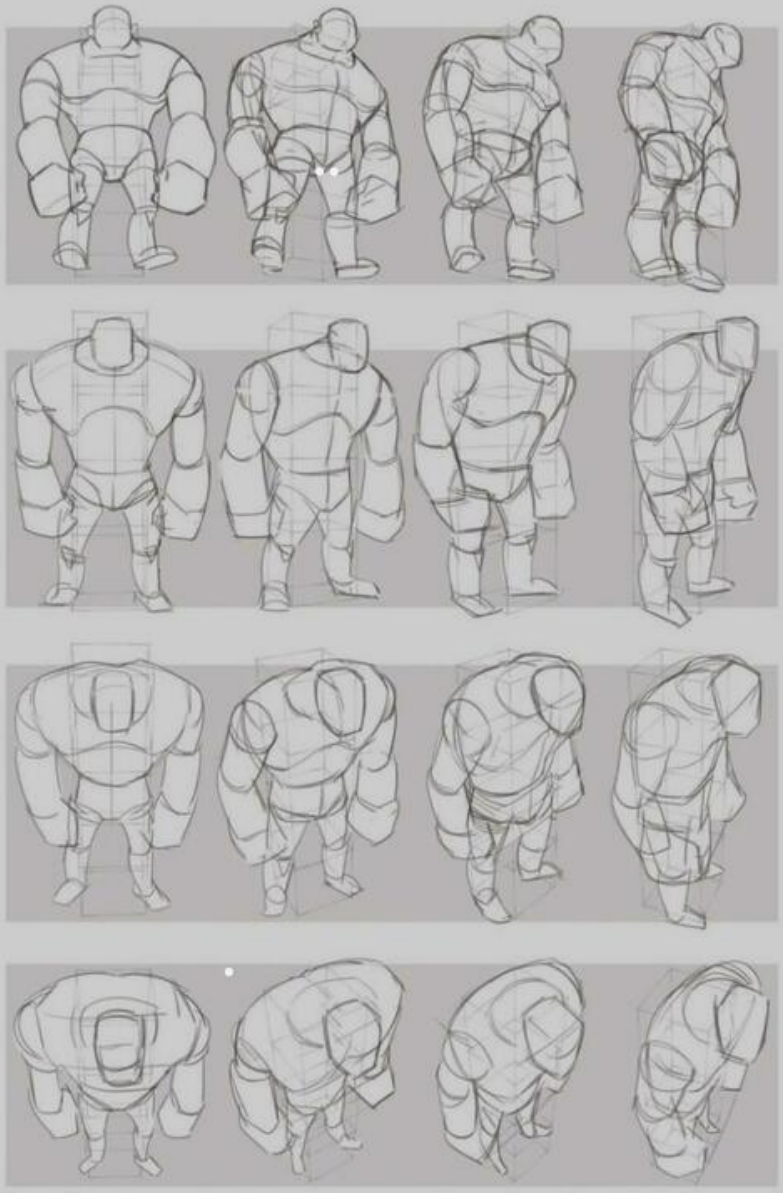
When drawing an anime human body, the proportion of the body mass can be adjusted.

Demonstration of the proportion of human body, the following exercises to draw different proportions of animation human body.


O





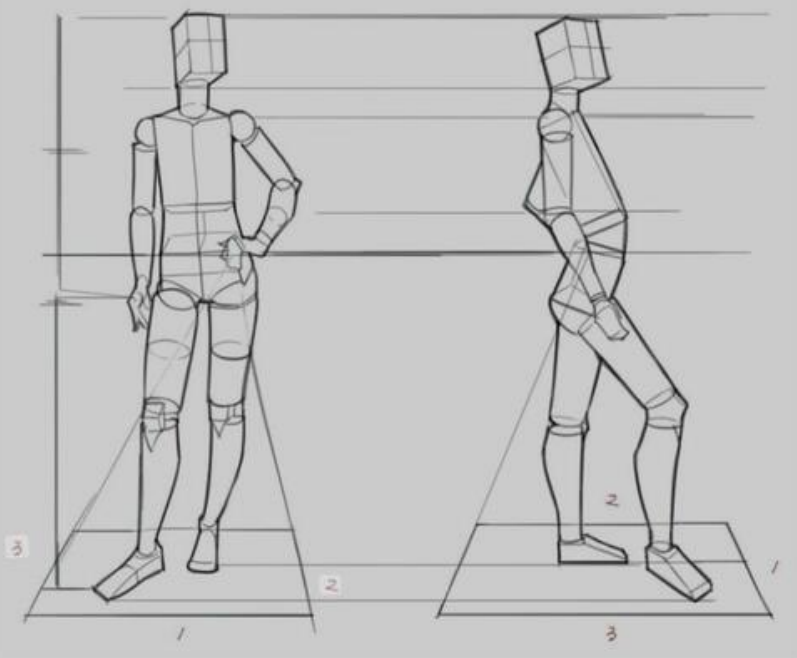


After mastering this method, you can try to practice with some familiar anime characters as a reference, first analyze the human body blocks, then draw the human body shapes from different angles, and add details to the characters according to the settings.

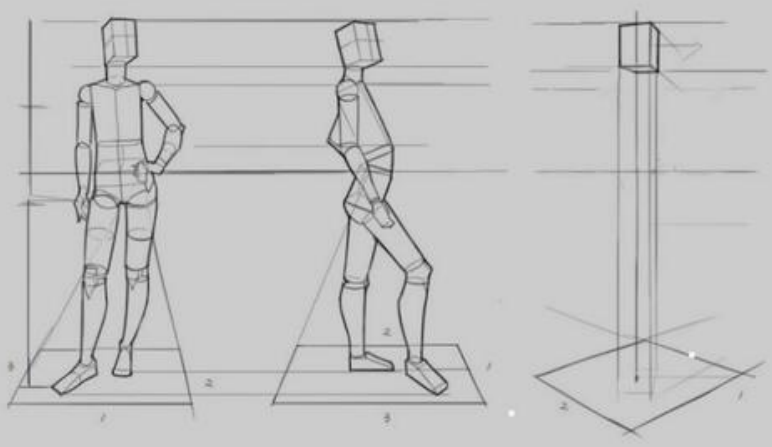
7.2.2 Body mass dynamics and angles of the human body

After mastering the proportions and spatial positions of human body blocks, you can practice drawing more complex human body dynamics and angles.

Start with a simple stance. You can refer to the body photos with front and side information (if there is no side angle, you can only draw the side by the front push).

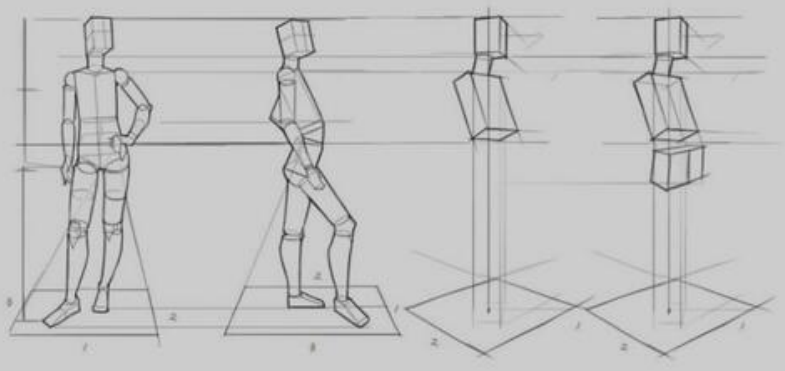


Analyze the body mass in the photo, and pay attention to mark the ground under the feet of the human body. As shown in the figure, the torso of the human body is facing orientation 1, and the face is facing between orientation 1 and orientation 2.

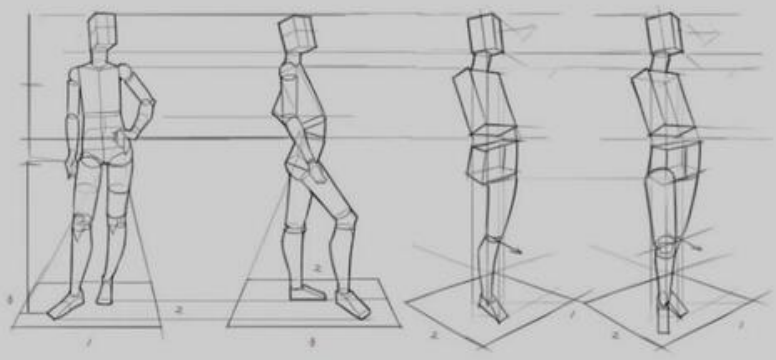


According to the human body shape in front and side, draw the human body shape after rotating 45°. First, draw the ground, noting that the vanishing point of the ground falls on the eye level of the waist. Secondly, to push the head, you can first draw a block representing the head on the ground, make sure the face is facing between orientation 1 and orientation 2, and then move the block up to the actual position of the head. Note that since the eye level is not

Similarly, after the head block is moved upward, the bottom surface of the block above the eye level should be visible.



Again, draw the torso. Note the bend and orientation of the torso as orientation 1.

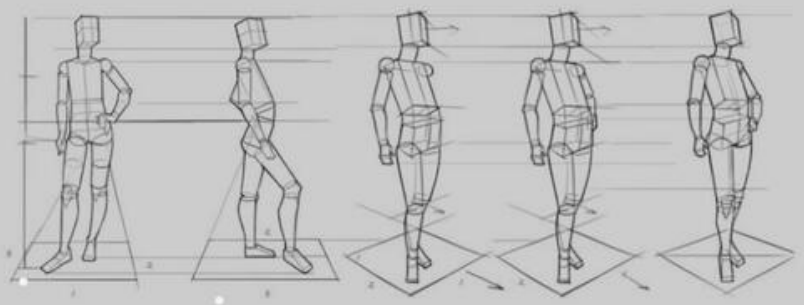


Finally, push to draw the legs and feet, and draw the arms. First calculate the position of the foot on the ground, then

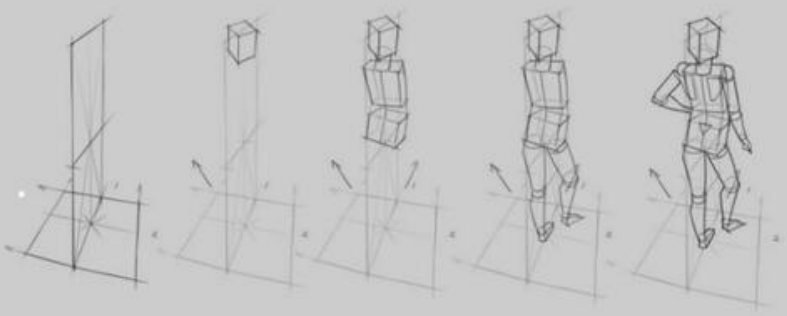
Then draw the legs according to the connection between the thighs and the pelvis.

According to the side view, it can be seen that the arm is located behind the thoracic cavity, and it is enough to make people feel comfortable

in terms of position performance. Arrange the lines, and complete the drawing of the human body with a parallel rotation of 45°.



According to the above steps, draw the shape of the human body posture from other angles. When drawing human forms from other angles, pay attention to the perspective compression ratio of space.



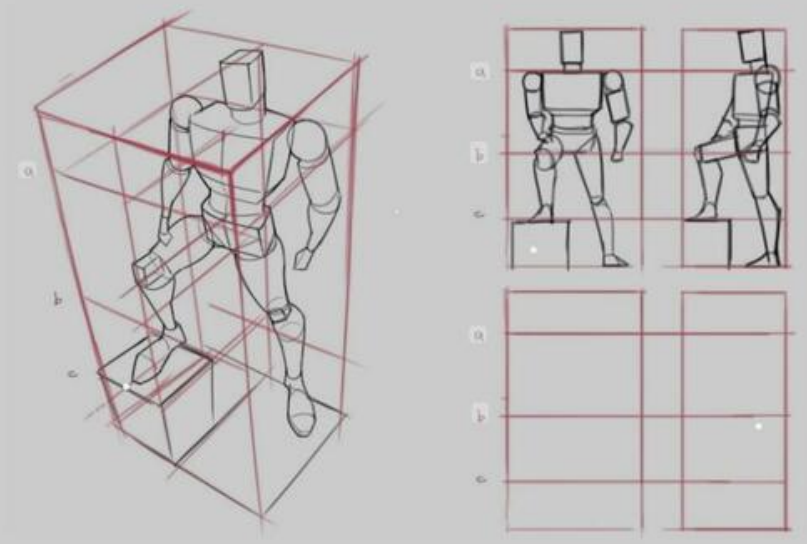
Take the following picture as an example, first determine a ground, then add a facade (this facade is determined by the height of the person), and then determine the middle position in the facade (the middle position represents the bottom of the pelvis of the human body)), so that the perspective effect will not be wrong.

The above method of calculating perspective can be used to analyze and draw various aspects of the characters in the illustration works.

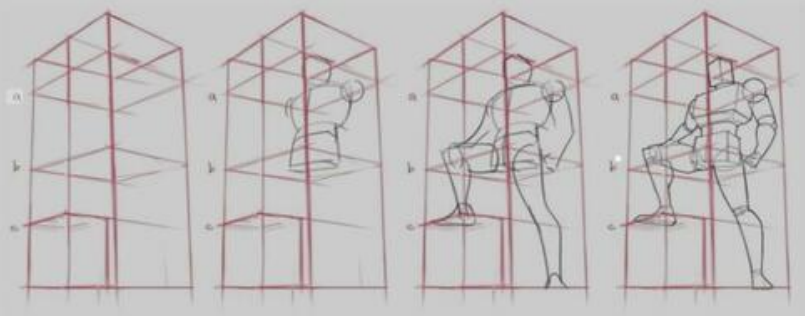
angle.

01 Analyze and draw the body of the character. It can be generalized according to the characteristics of the human body shape. The generalized blocks must fit the prototype of the characters in the work. At the same time, it should be generalized as much as possible, so that it is convenient to imagine and deduce the shape of other angles during the practice of turning angles.

02 Use large squares to summarize the human body mass, analyze the proportion of the human body mass, and mark the location of the human body mass s position.



03 Convert the outlined large squares to different angles, and pay attention to control the proportion of the squares after the angle conversion. Then determine the size, shape and position of the human body block in the square after the angle conversion set.

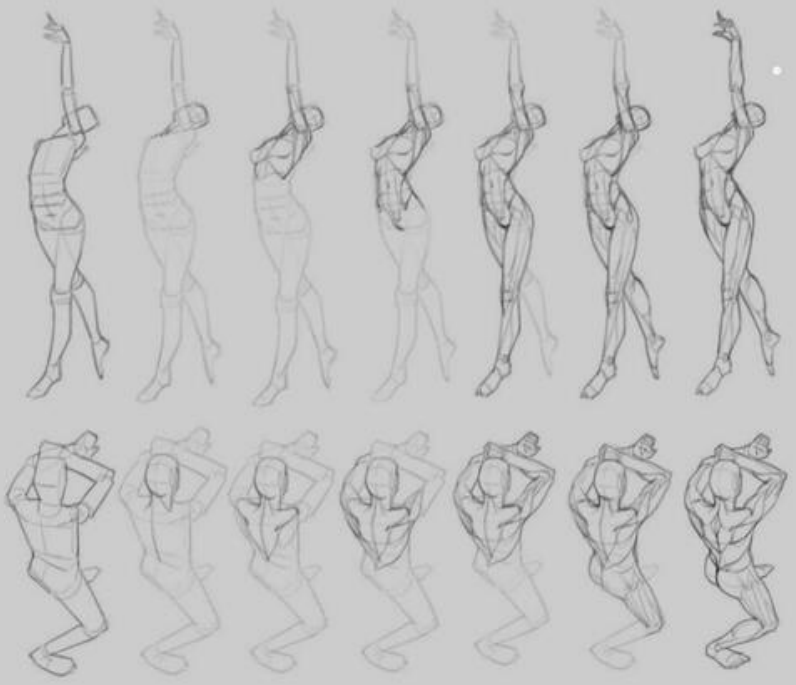


04 Refine the human block structure in the block.

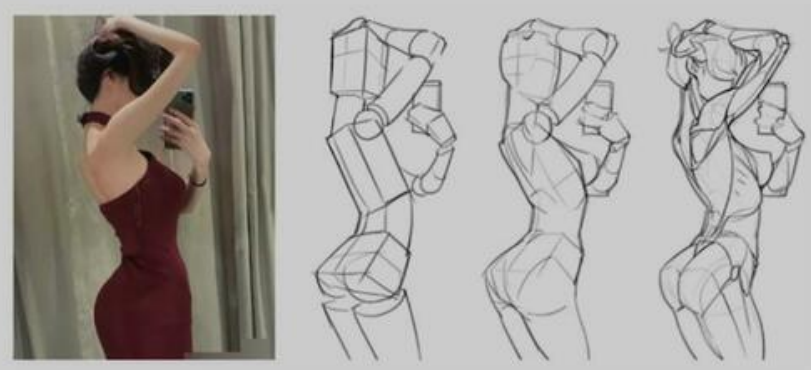
7.2.3 Transformation of body mass and muscular man

According to the drawing method of different angles of different parts of the human body mentioned above, we can turn the square person into a more real human body.

Based on the volume, add muscles according to the connection points and shapes of the muscles, and you can draw the human body from the head down.



If you can't think of any dynamic poses to practice, you can refer to the photos and draw the body and muscles according to the characters in the photos.



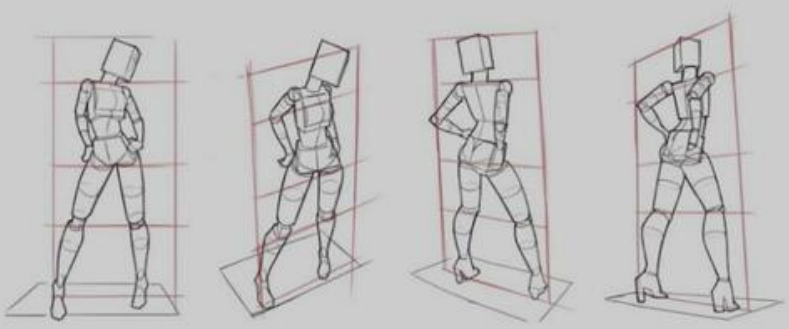
Combined with the previous practice of turning angles, groups of human body dynamic analysis exercises can be carried out. Here, we choose to refer to the character dynamics on a photo or an anime character image, and then push out. This draws its shape from different angles.

hint

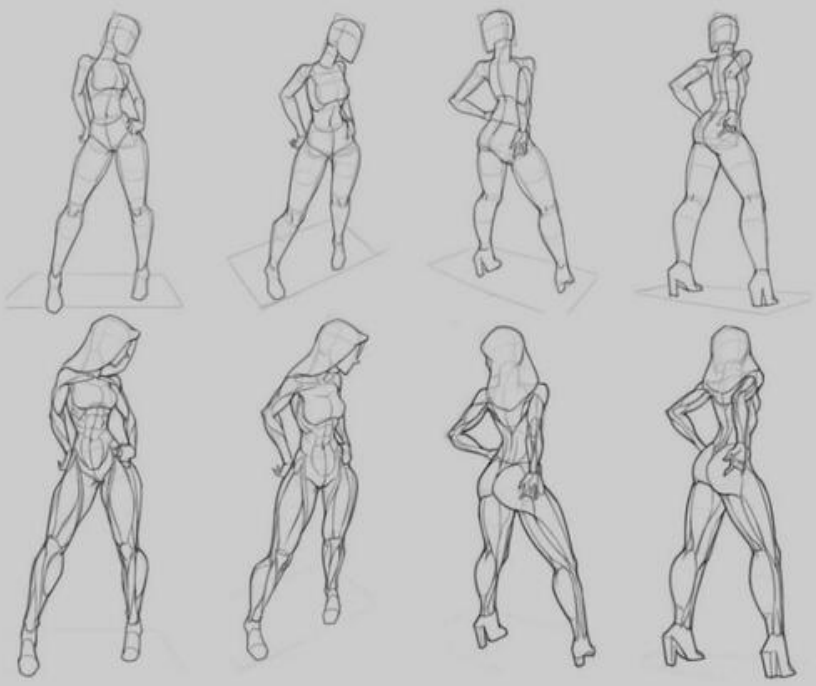
In the early stage, you can perform multi-angle analysis with animation figures. While pushing the drawing, you can combine the real objects to analyze. You can first draw three less difficult translation and rotation human bodies, and then draw three more difficult looking down or upward human bodies.

After having the above painting experience, you can take photos to analyze, the specific analysis process is as follows Down.

First, draw the human body structure with relatively smooth lines according to the block. This step mainly considers whether the lines are smooth and whether the perspective of the block is accurate, and whether the two are compatible.



Secondly, analyze human muscles on the basis of correct perspective relationship of body mass and smooth human body lines, add muscles from head to toe according to the interspersed relationship of muscles, and draw the whole human body.



Finally, the muscles are refined with trade-offs and other details are added as appropriate. have muscle

The human body will appear more realistic, so it is necessary to learn to describe the muscles. Note that when drawing the human body,

the depiction of the muscles should be moderate, and it is not necessary to draw all of them.

According to different painting styles, the degree of depiction of human muscle details can be flexibly adjusted.

7.3 Basic performance of human body dynamics

Various dynamic poses are the key points when drawing. Dynamic poses can reflect the temperament and character of the characters. If they are performed properly, they can make the picture more tense and expressive. Many people understand the structure of the human body but do not know how to express the dynamics of the human body.

7.3.1 "Twisting Torso" of Dynamic Core

The most difficult thing to grasp about human body dynamics is the twisting of the torso, and it is often the easiest to

The place is the torso.

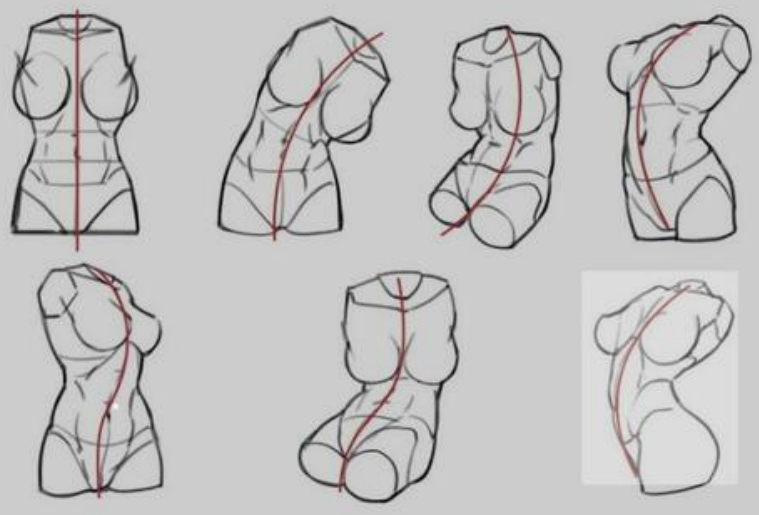
draw rigid ones when drawing the human body. We can think of the torso as an eraser, or as a piece between two blocks.

Eraser, and this eraser can be twisted freely. When practicing, avoid drawing the torso too rigidly or with the upper and lower body oriented in the same direction.

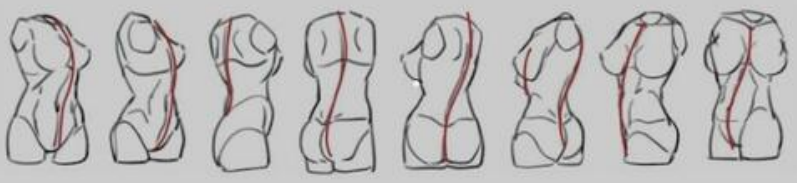
The dynamic line of the human body runs through the torso, generally through the back spine or the front midline. To judge whether the dynamic line is the most important one, is to see whether it runs from head to foot.

Many people think that dynamic lines are flat, but they are not. Dynamic lines can be placed in space.

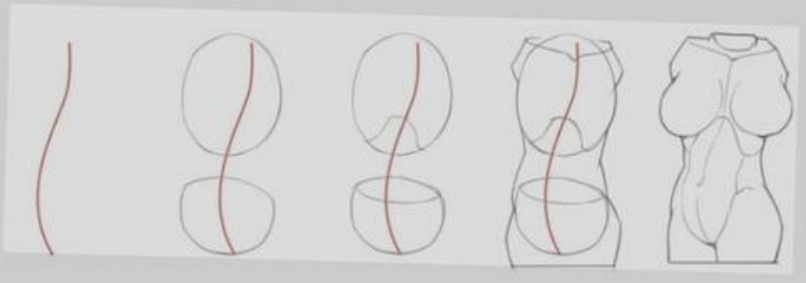
Taking the different states of the torso as a reference, the torso of different angles can be drawn according to the position of the dynamic line in space.



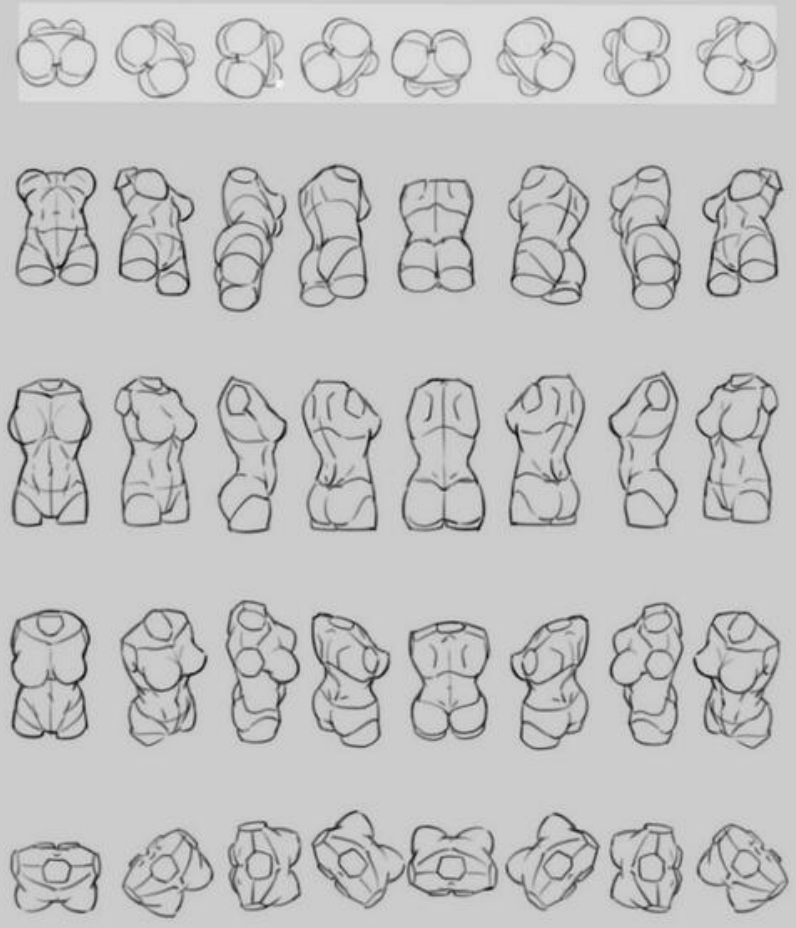
For the torso that can see both sides, two dynamic lines can be separated for performance.



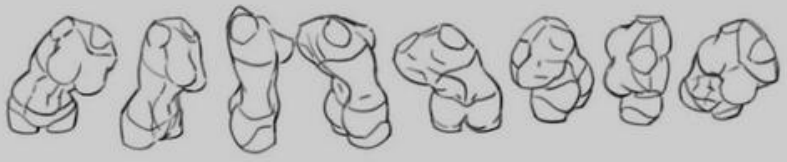
During practice, the body blocks can be connected according to the length ratio and radian change of the dynamic line, the torso of different angles can be drawn, and the understanding of the dynamic line can be deepened by expressing the twisted torso shape.

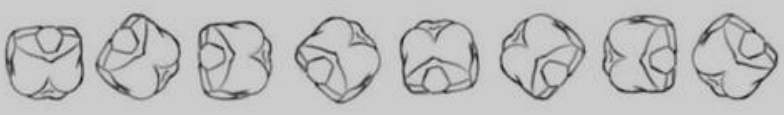


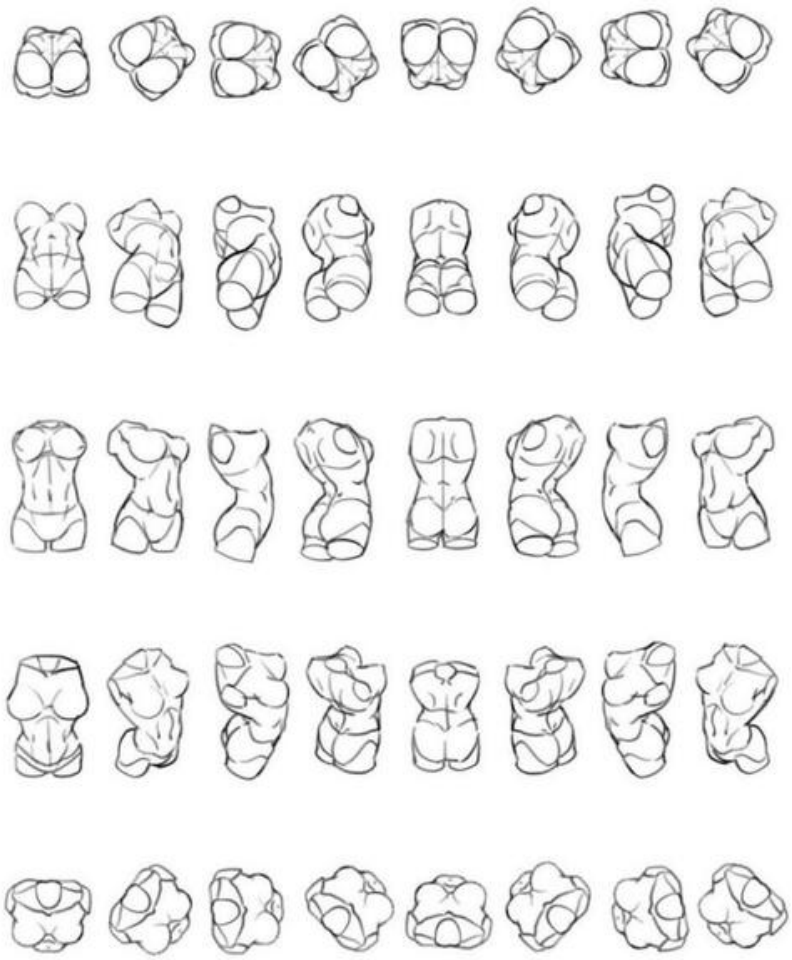
Dynamic performance of torso twisting at different angles.

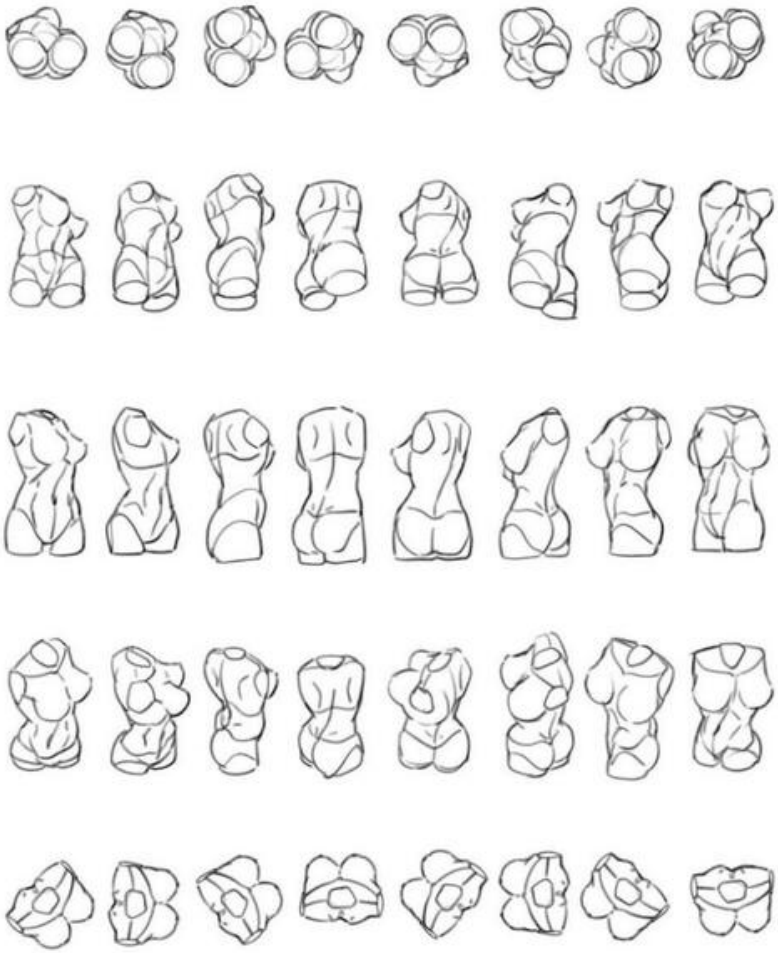


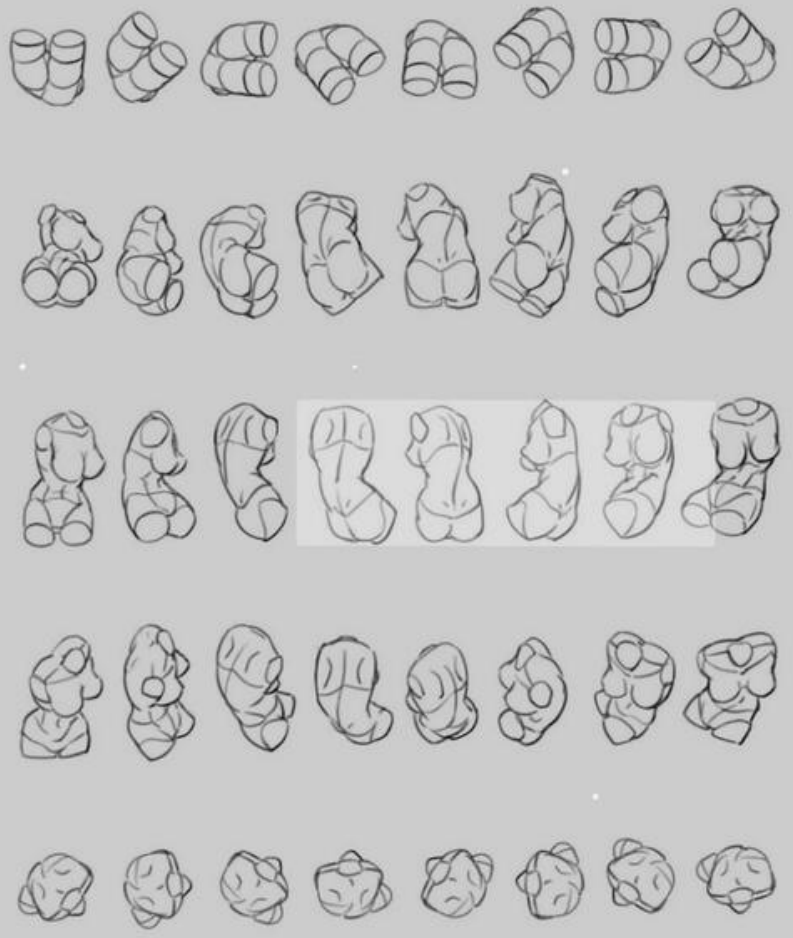
BA9987€ B





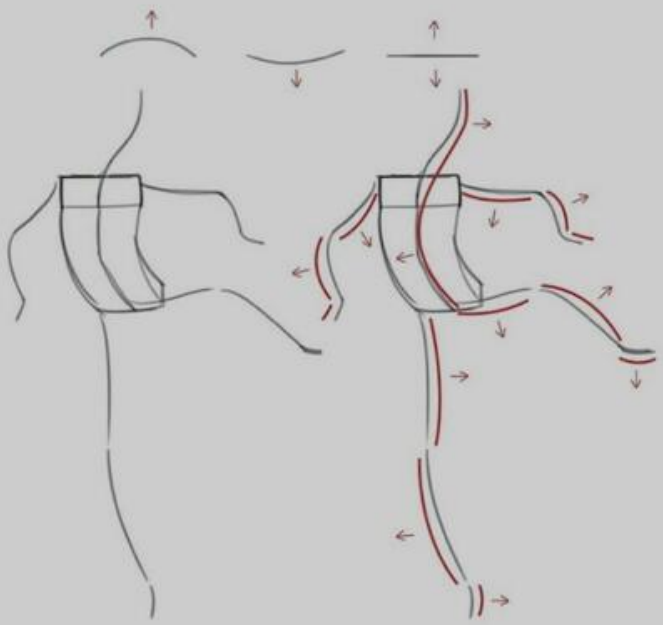






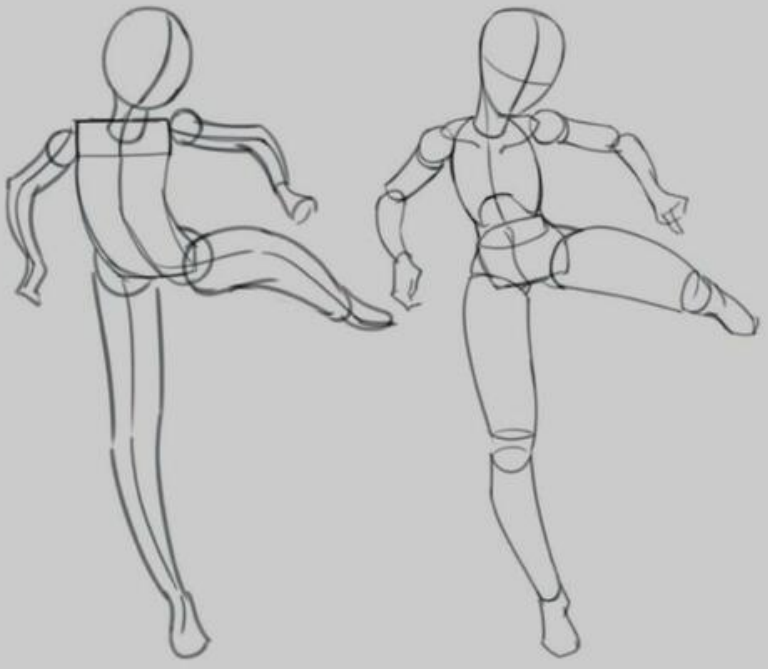
7.3.2 The influence of twisting of limbs and head on human body dynamics

With the twisting dynamics of the torso as the backbone, and the twisting coordination of the limbs and the head, beautiful human body dynamics can be drawn.



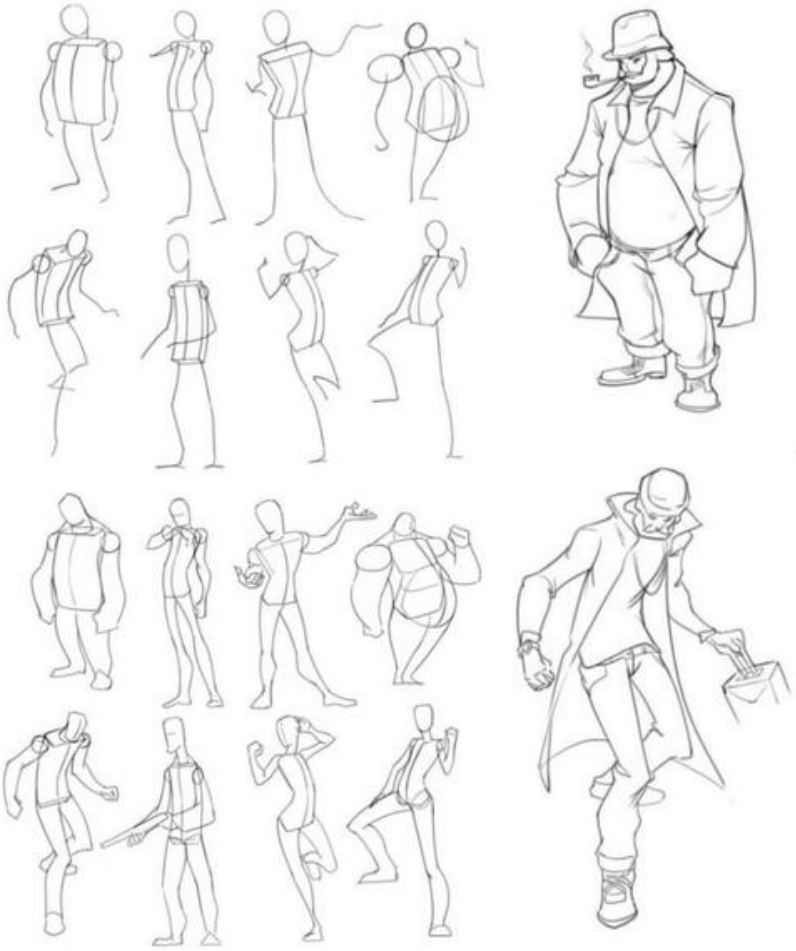
If you want the human body to have a sense of rhythm, you can use positive and negative arcs and straight lines to summarize the human body structure.

structure.



The human body structure is drawn with the dynamic line as a guide, and the shape of the figure is continued to be refined in the structure.

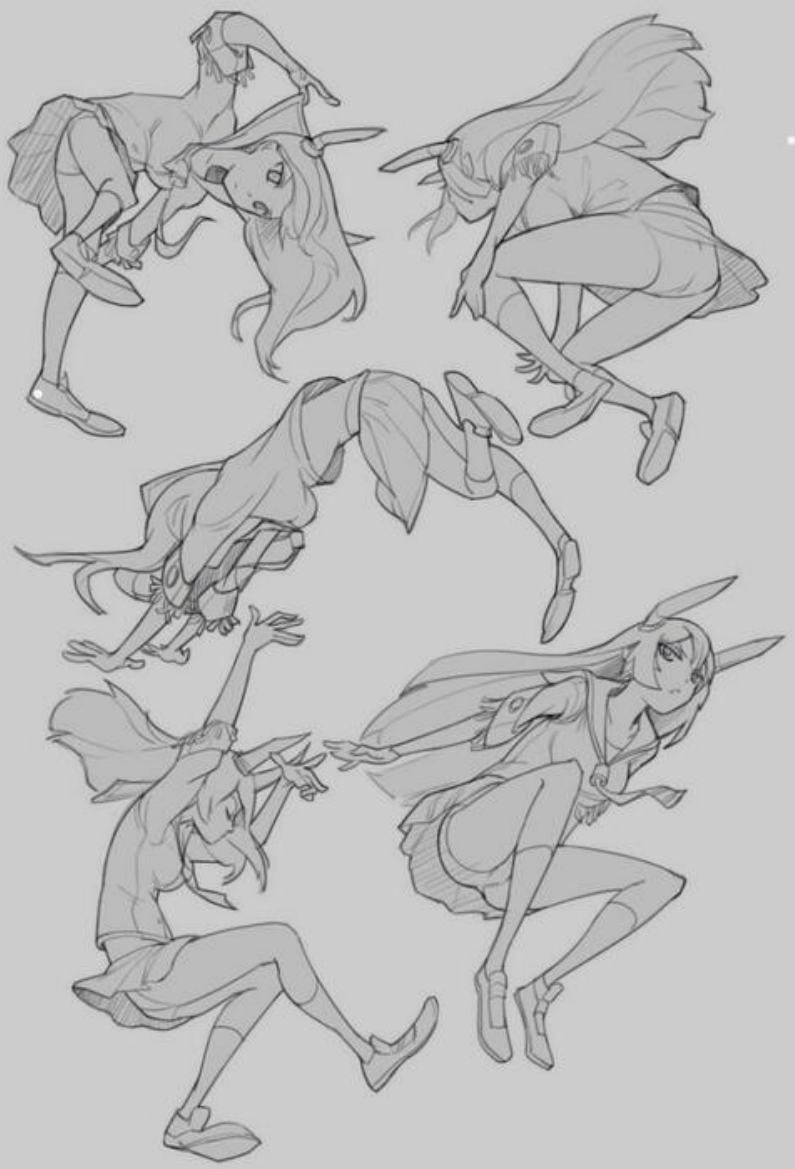
The dynamic line can be changed according to the change of the proportion of the block, drawing inferences from one thing to another and drawing interesting characters in various proportions.



It exaggerates and deforms the movements of the characters in the photos, and draws a smooth human movement similar to the American cartoon style.

Combining the modeling characteristics of American animation characters and Japanese animation characters, it is possible to draw

More interesting characters.



hint

It is necessary to simplify the dynamic lines of the limbs and torso of the character, so that the limbs and the torso

Dry connections are smoother and more natural.

7.3.3 Combining dynamic lines with graphics

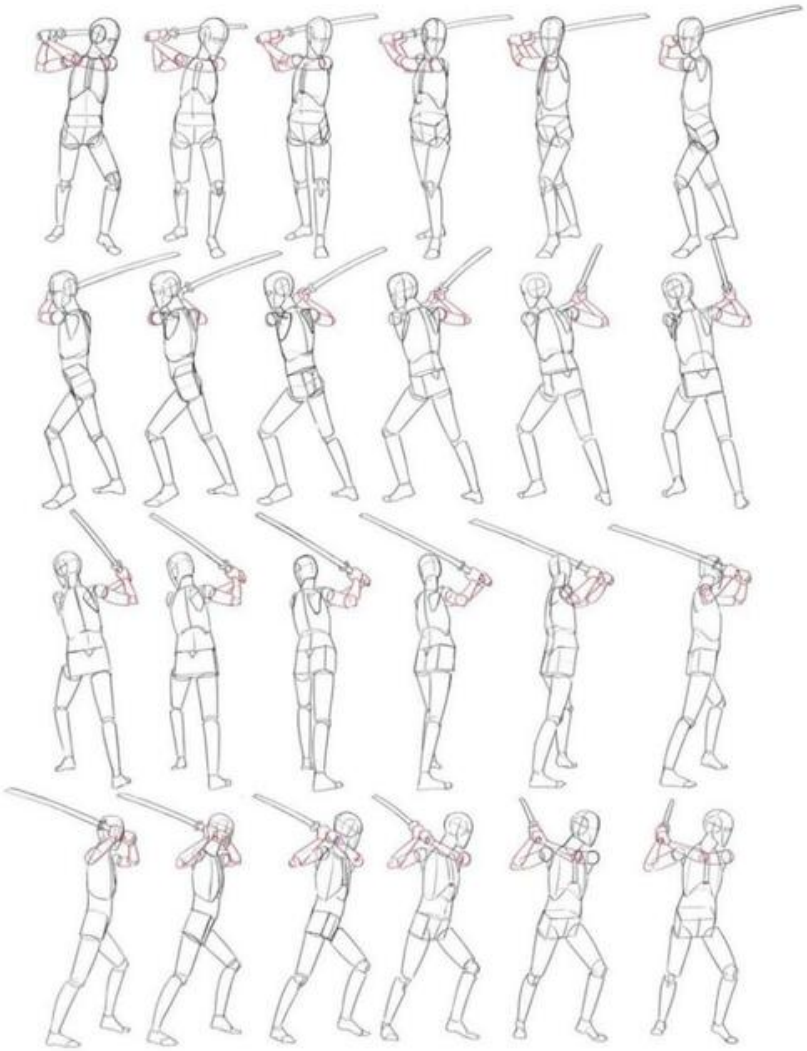
By summarizing human body dynamics with dynamic lines and graphics, it can make the picture look more holistic and more formal.

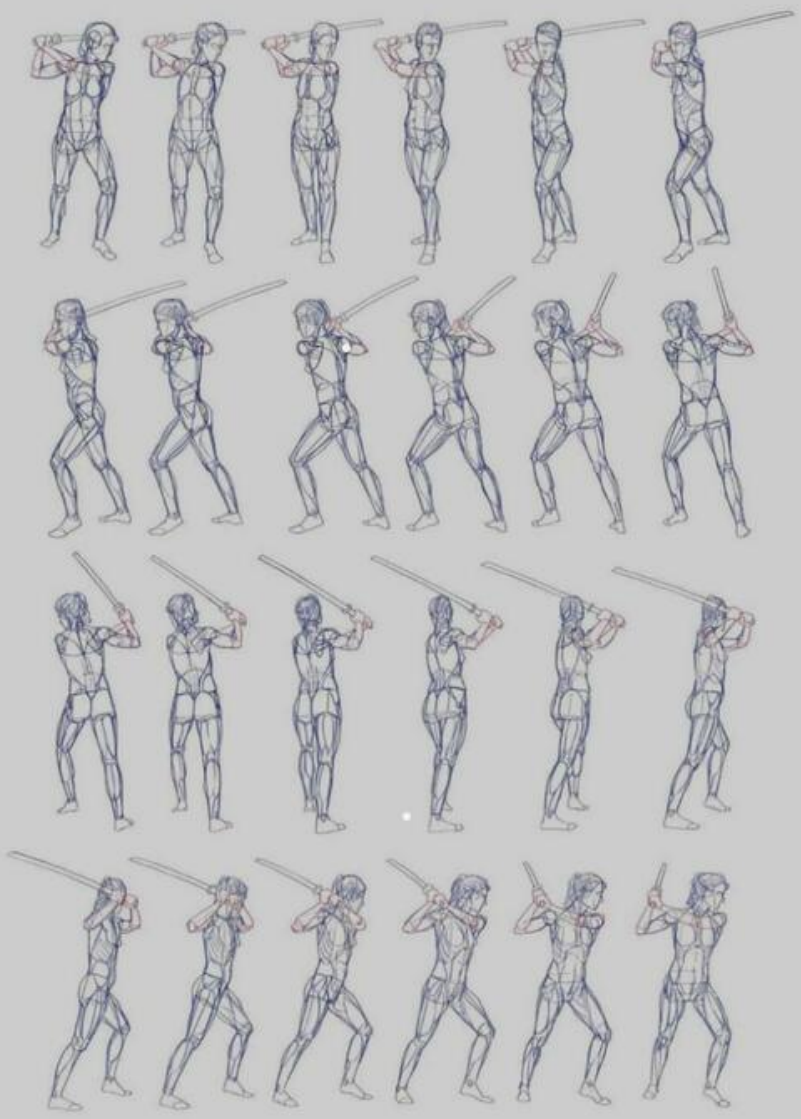
If you don't know how to compose a picture when you practice drawing human body dynamics, you can refer to some photos with a strong sense of form, such as choosing a photo with a triangular, rectangular or parallelogram composition as a whole.

Summarizing the human body into graphics can make the drawn human body have a higher degree of recognition and leave a deeper impression on people. In daily practice, it is necessary to use more graphics and dynamic lines to summarize the structure of the human body.

7.3.4 Dynamic performance of human body from multiple angles and motion trends

When learning to draw the human body, it is necessary to consider the change of the angle of the human body, and the human body dynamics of different angles can be estimated by means of the method of rotation angle calculation.

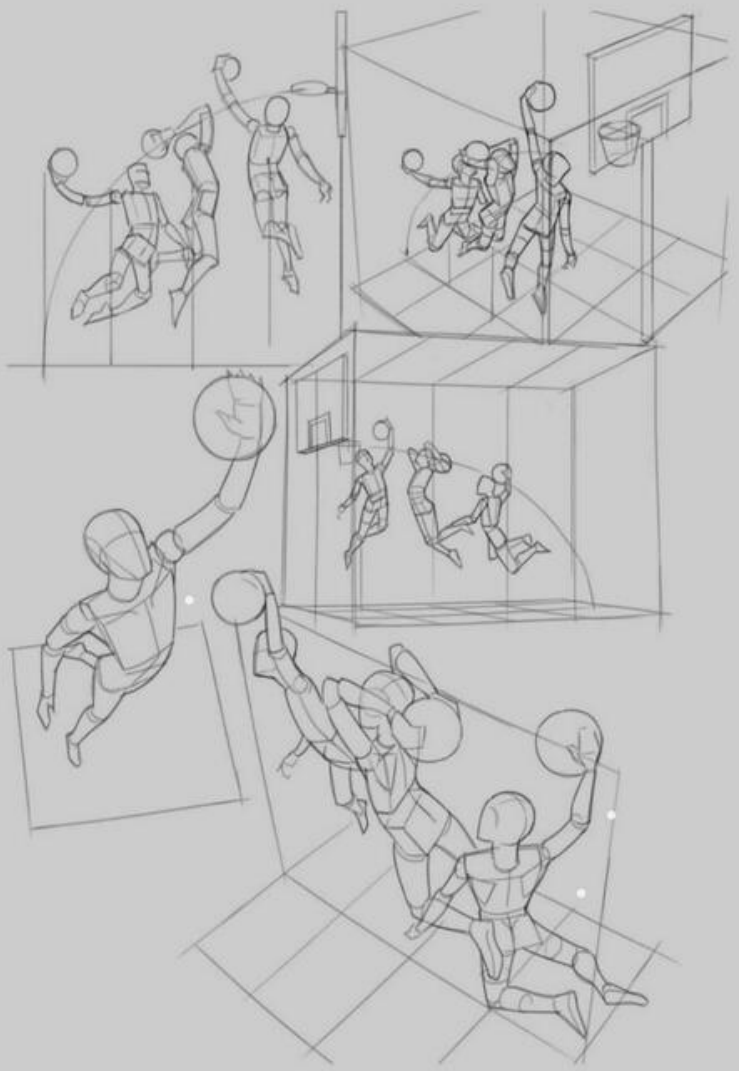


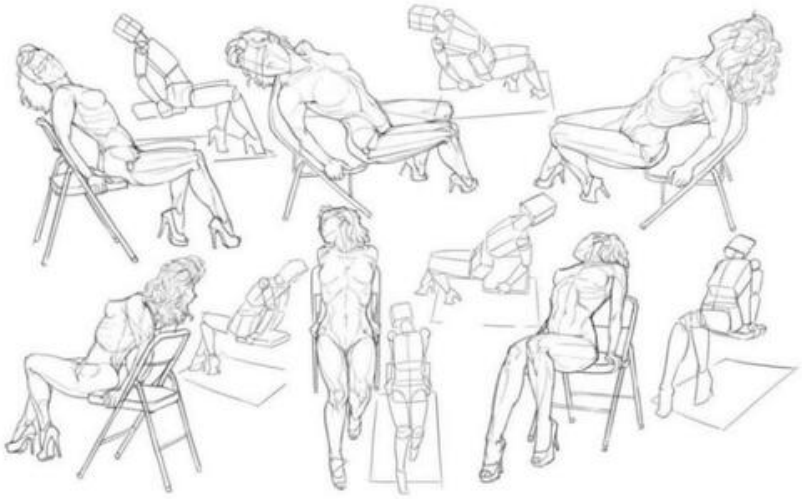


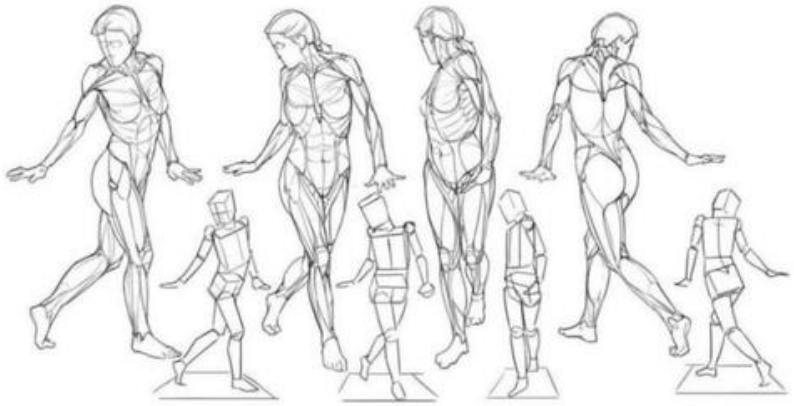
Learning to draw a dynamic human body requires not only grasping the dynamics of a single human body, but also grasping the dynamics of a continuous human body.

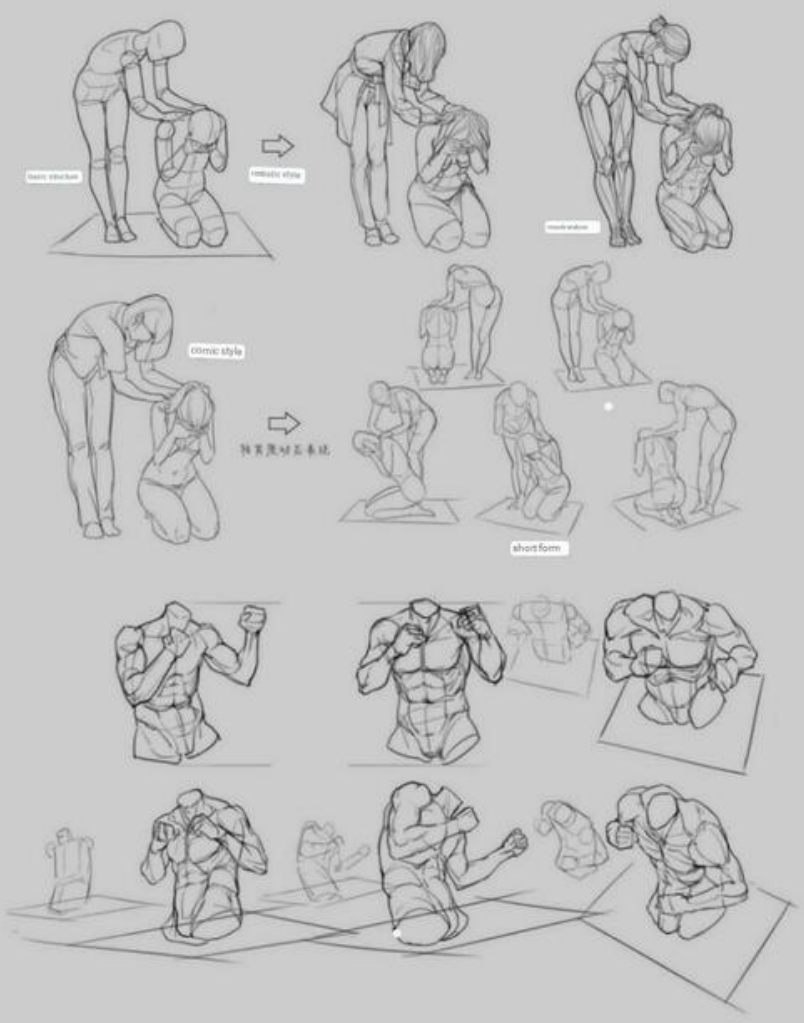
More special training

Do a set of multi-angle body rotation exercises.







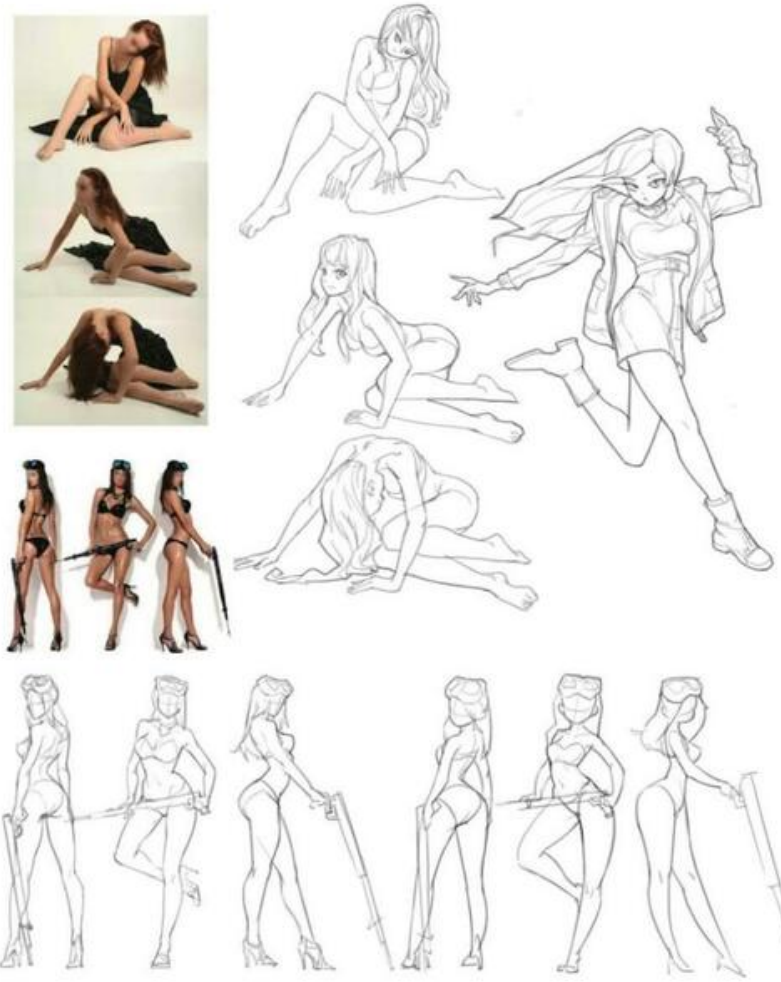


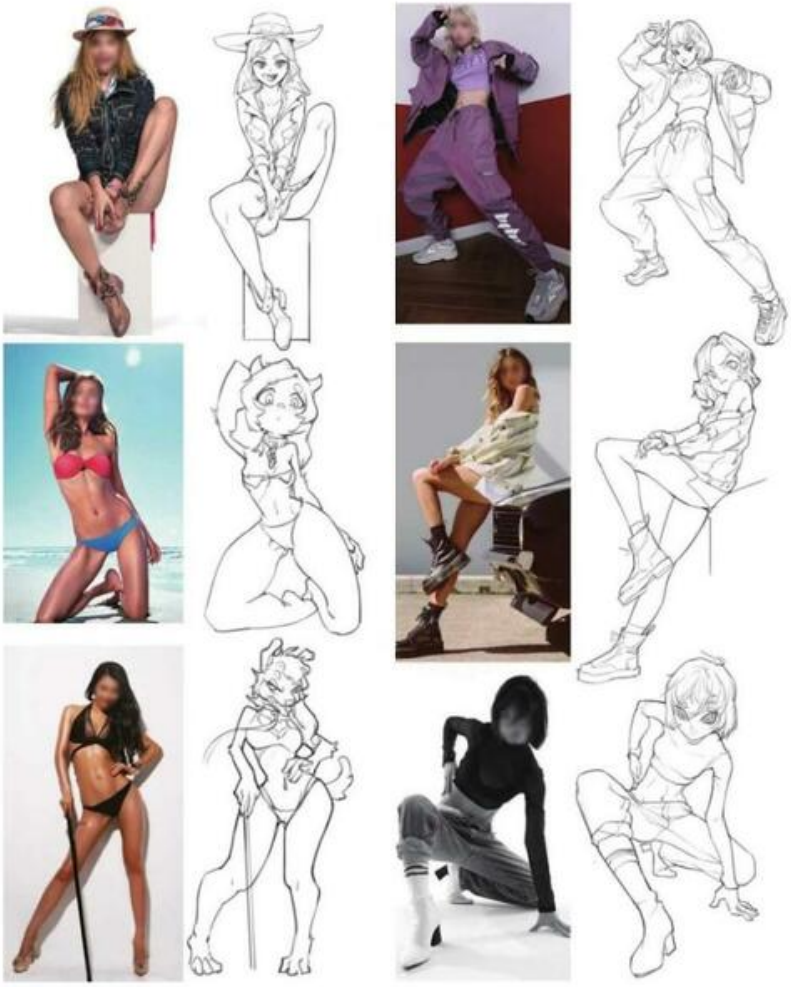
Do a set of 1-minute body dynamic sketching exercises.

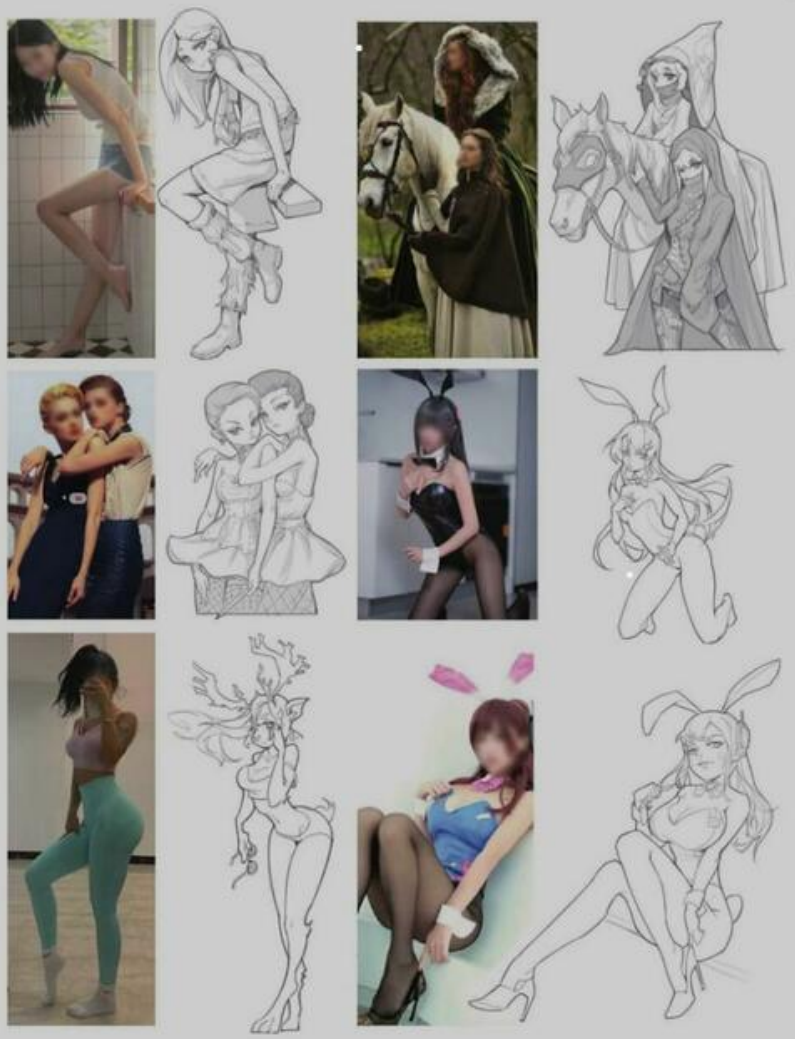
Do a set of 2-minute body dynamic sketching exercises.

Do a set of dynamic exercises for the cube man and the structure man.

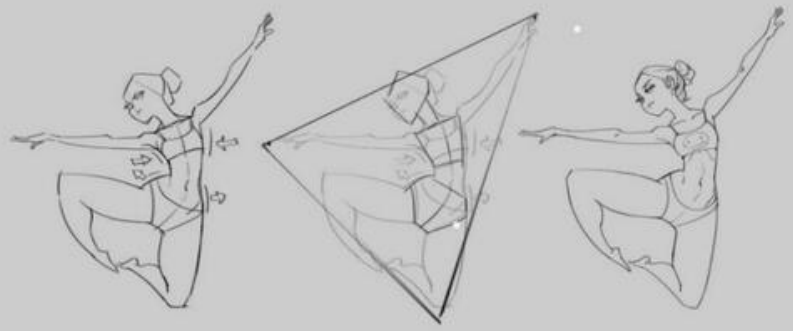
Do a set of body dynamics exercises with reference to the photos.







Do a group of multi-style character conversion exercises, and pay attention to adjusting the proportions of the sketched human body.

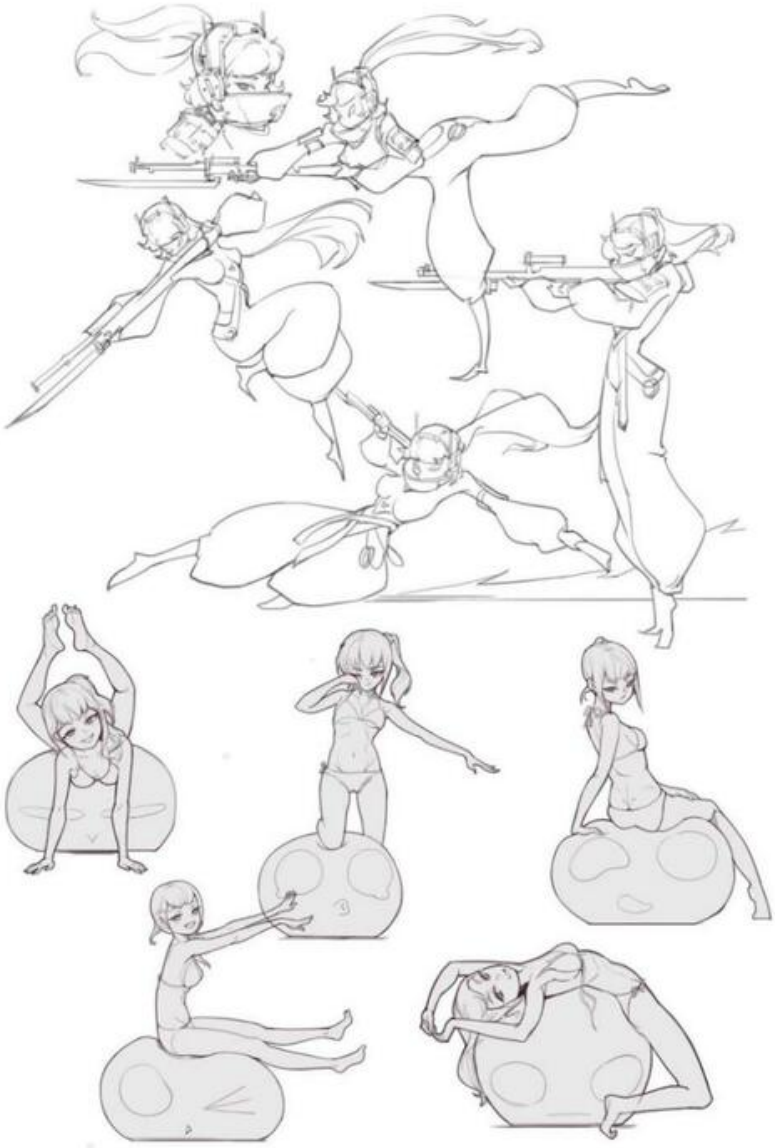


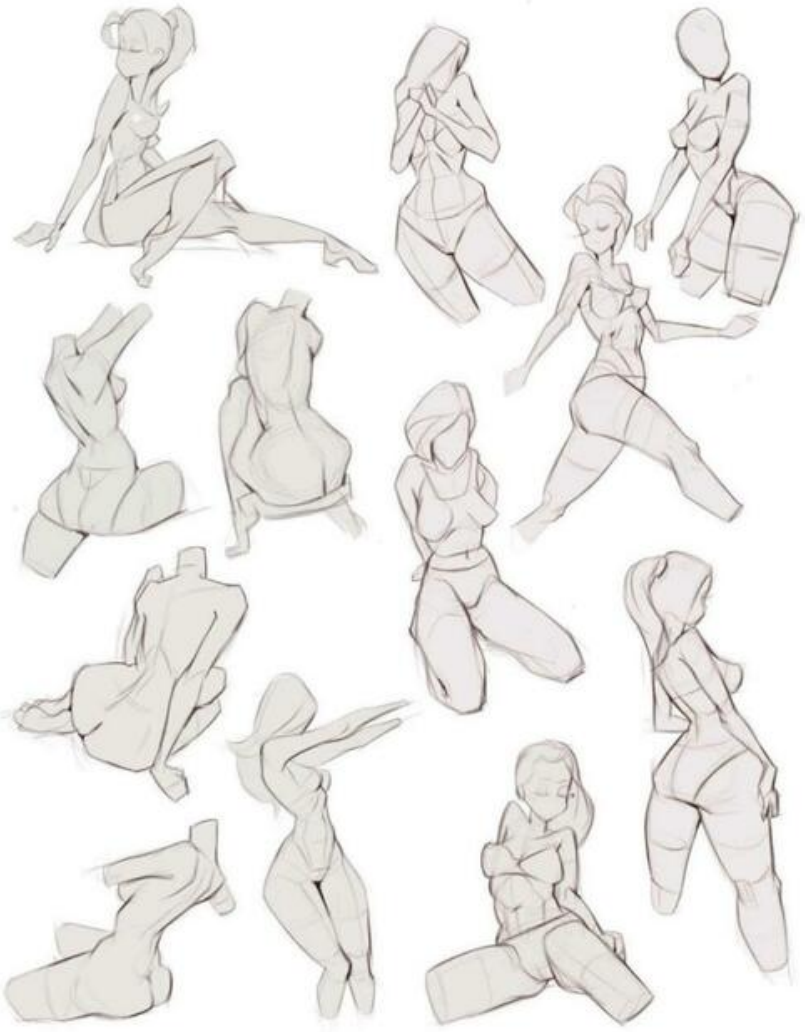
Strengthen the contrast of the volume, summarize the structure with straight lines or curves, and strengthen the shape of the figure

Appropriately simplify sketches and change characters' costumes

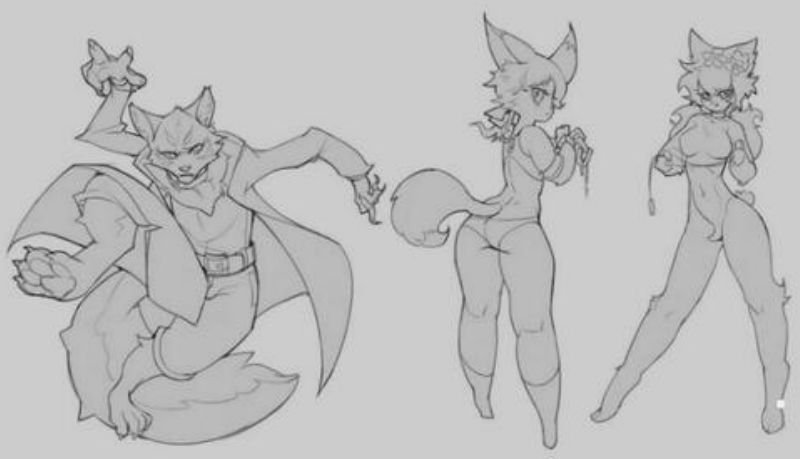
Draw the same action in combination with the image of the cat, continue to adjust the costumes to draw different styles of character images

Do a group of human body dynamic deformation exercises.





Do a set of Orc Dynamic Exercises.

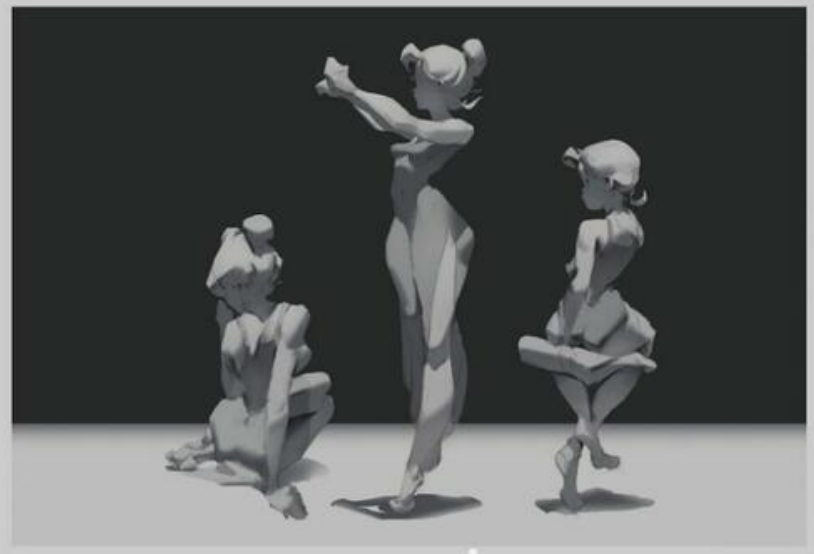


Chapter 8 Light and Shadow Special Training

In actual painting, only after mastering the previous knowledge points, and then learning light and shadow, can the previously learned knowledge points be better applied. This chapter explains the theoretical knowledge of light and shadow and the application skills of light and shadow in actual painting. Here, the author will lead you to carry out systematic light and shadow exercises through the systematic extraction of light and shadow knowledge points and case analysis and analysis, so as to enhance everyone's understanding and understanding of structure and three-dimensional sense.

8.1 Basic Concepts of Light and Shadow

The basis for expressing things in painting is that there is light. Without light, we cannot see the world in front of us, let alone paint. Light makes the object appear in front of us, and produces a strong contrast of light and dark, showing the clear outline of the object, allowing people to see the ever-changing light and shadow. 象。



8.1.1 The three sides and the five tones

The three major surfaces refer to the bright surface, the dark surface and the gray surface formed by the object under the light source, and the gray surface is also called the transition surface.

The five tones refer to highlights, midtones, light-dark lines, reflections, and shadows.

Highlights: generally refers to the brightest part of an object after being exposed to light. Different materials show different highlights. For example, objects with smooth surfaces have more obvious highlights when exposed to light, and objects with rough surfaces have softer highlights and are not easy to be observed.

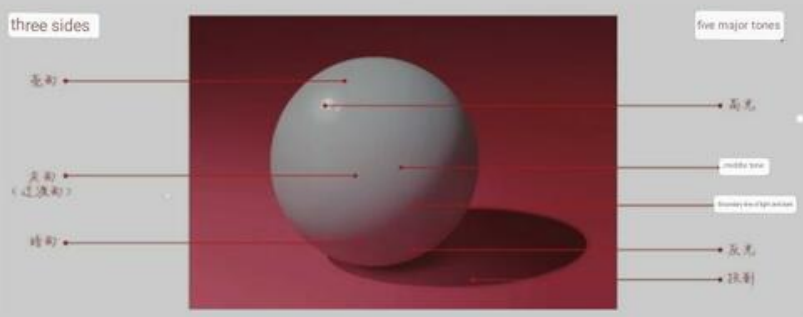
Midtone: generally refers to the area in the picture with the most color performance, and the area that can be restored to the greatest extent

The area of the object's inherent color. When painting, you must pay attention to observation. When the intrinsic color of the object is darker, the midtones are also darker.

Light-dark boundary line: It means that there will be a boundary line between the bright side and the dark side of the object after being exposed to light, and the color of this boundary line part also belongs to the darkest color in the entire surface of the object. It should be noted here that when depicting the boundary line of light and dark of an object, it should not be too realistic, otherwise the picture effect will appear stiff. Moreover, the material of the objects in the real world will also affect the depth of the light-dark boundary. For example, the light-dark boundary of objects with a smooth surface (such as metal) is sharper, and the light-dark boundary of objects with a rough surface is softer.

Reflection: Refers to the light source formed by the object in the dark area. Generally, the reflective color belongs to the lightest color in the dark area, and the reflective light will be affected by the surrounding environment color. For example, glass and smooth metal will reflect extremely strongly after being exposed to light, and may even reflect nearby objects.

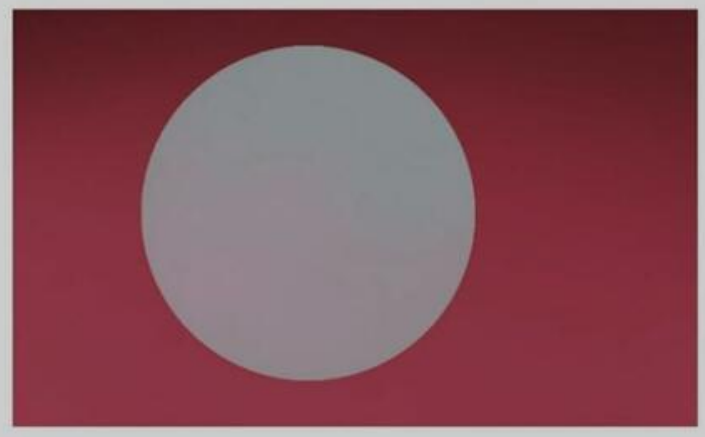
Projection: Also known as shadow, it refers to the shadow part cast by an object when it is exposed to light. In general, shadows are darkest in areas near objects that are not exposed to light.



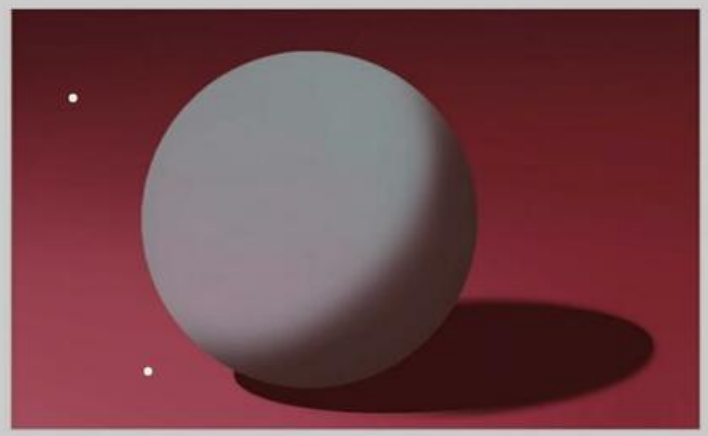
In order to let everyone further understand the concept of light and shadow, the following is a brief analysis of the drawing of a sphere under light and shadow.

manufacturing process.

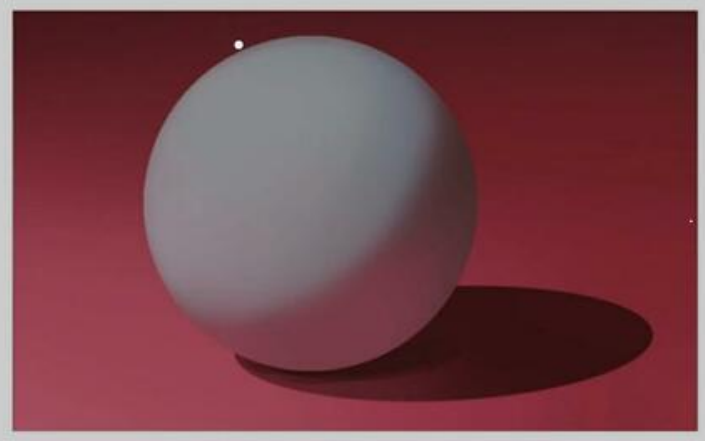
01 Draw a white circle and fill the canvas with the background color.



02 Determine the light and shadow. Set the position of the light source in the upper left corner of the canvas, and use the color block to divide the bright side, dark side, light-dark boundary line and projection area of the sphere.

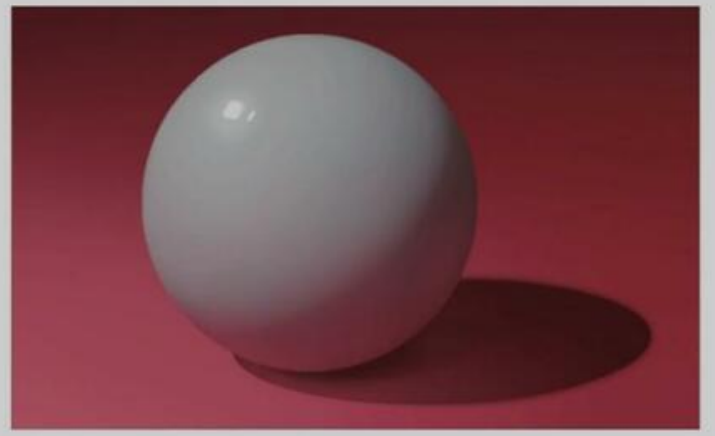


03 According to the light and shadow, the reflective surface of the sphere is depicted, and then the object is affected by the ambient light according to the distance. to add a red background color to the reflective areas.



04 Add the occlusion of the sphere and the ground (more on this concept later) areas, as well as the sphere highlight. In this way, a sphere with complete light and shadow effects is drawn.

.



hint

Since the background color is red, the reflective area of the sphere is biased after being affected by the ambient light.

red.

Next, according to the principle of light and shadow, we will analyze how to analyze and use light and shadow in the process of building human body blocks.

01 Decompose the human body into simple geometric shapes, analyze and determine the three major components of each geometric shape.

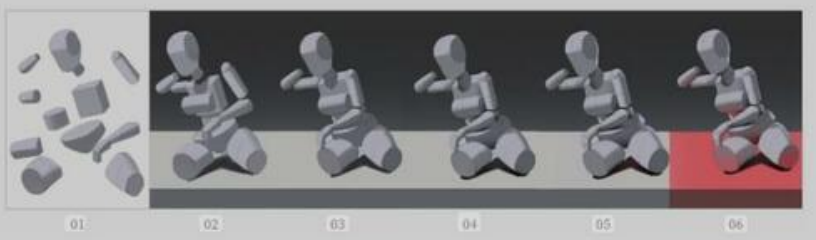
noodle.

02 Set the background color of the canvas as required, and then try to combine the blocks representing various parts of the human body, analyze and express the projections generated between the blocks.

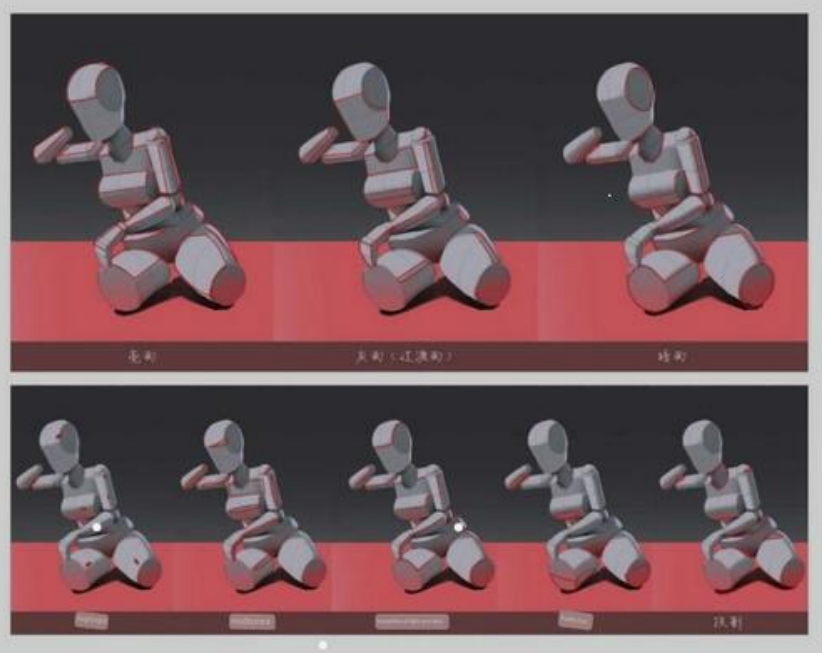
03 Analyze and identify light and dark borders and midtones.

04 Further darkens the shades of places that are not illuminated.

05 Virtually add a contour side light to strengthen the three-dimensional sense of the human body. 06 Set an ambient color, and then draw the reflective part of the screen according to the ambient color.



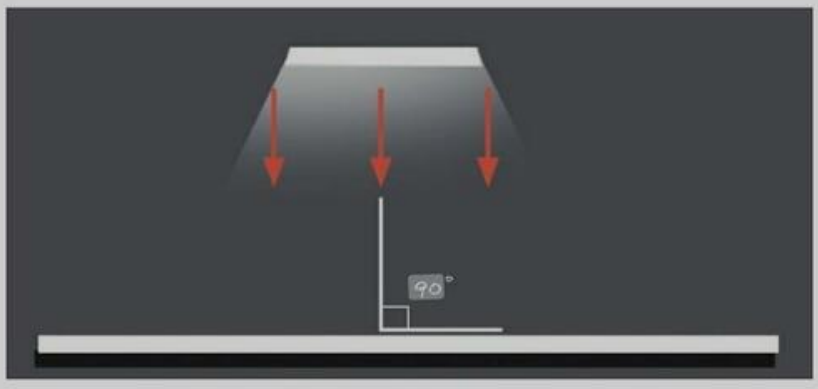
The schematic diagram of the distribution of the three major faces and five major tones of the human body is as follows.



8.1.2 How to calculate light and shade

The essence of vision is to perceive light. Volume exists objectively, but the human eye cannot perceive volume directly, only through light.

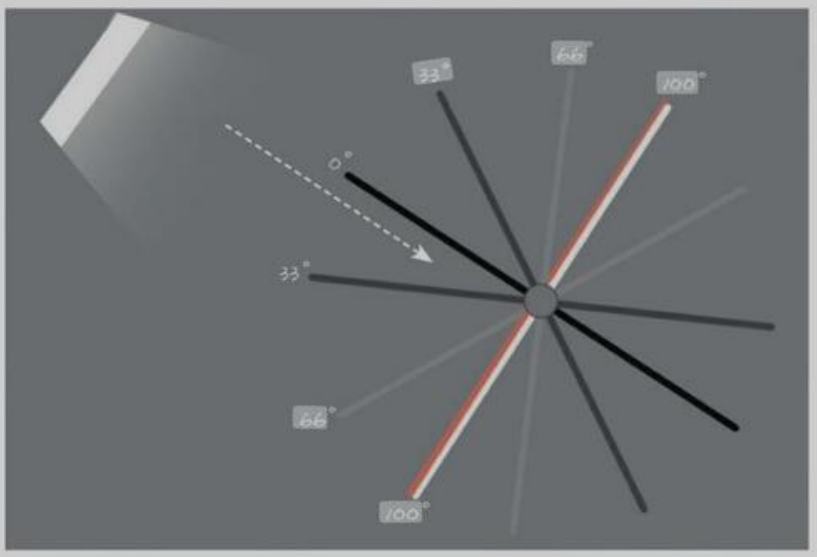
Below, we use a schematic diagram to feel the visual changes of objects affected by different light sources.



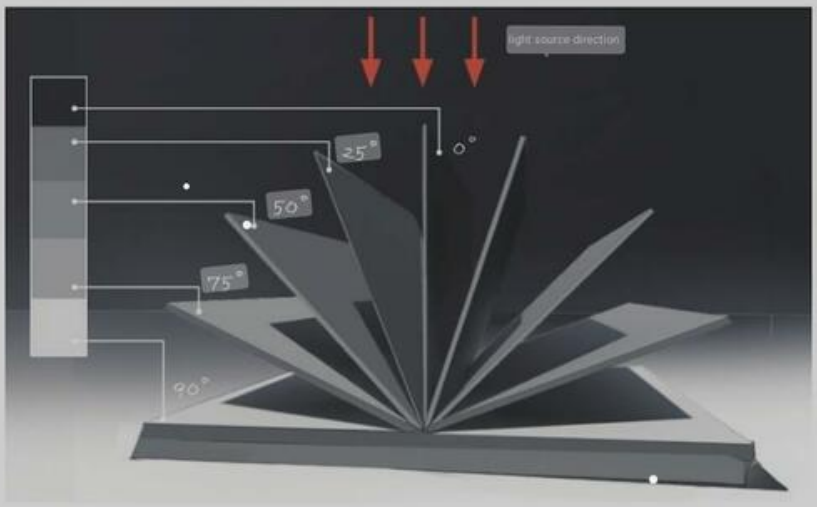
When the light hits the object vertically, the brightness of the light reaches its maximum value.

When the light is parallel to the object or facing away from the object, the brightness of the light appears to be the minimum.

Place the light and shadow measuring instrument at the vertical angle of direct light and shadow, and you can easily calculate the approximate value of light and shadow, as shown in the figure below. This method can help us understand the objective laws of light and shadow, without paying too much attention to the accuracy of numerical values, otherwise the meaning of painting will be lost.



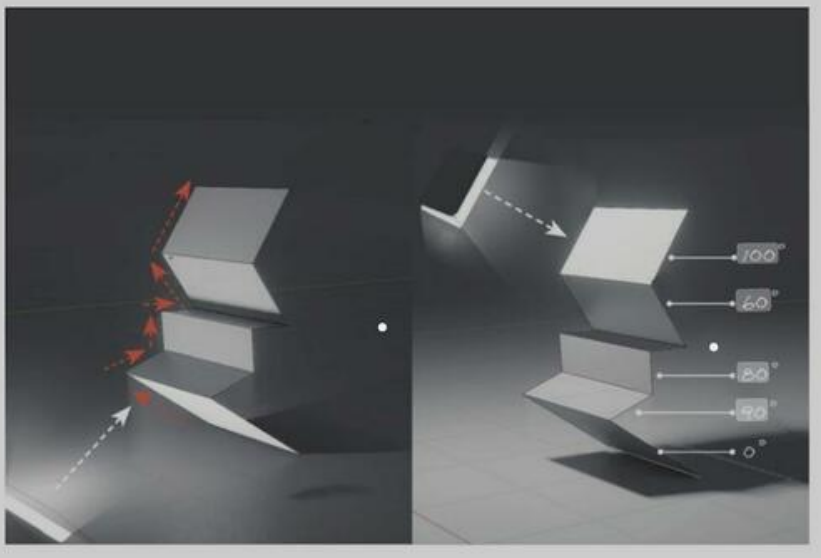
Here, we can open the book and do a lighting experiment against the desk lamp, and we will find that the greater the angle between the paper and the light and shadow (maximum 90°), the stronger the lighting effect, and vice versa, the weaker the lighting effect.



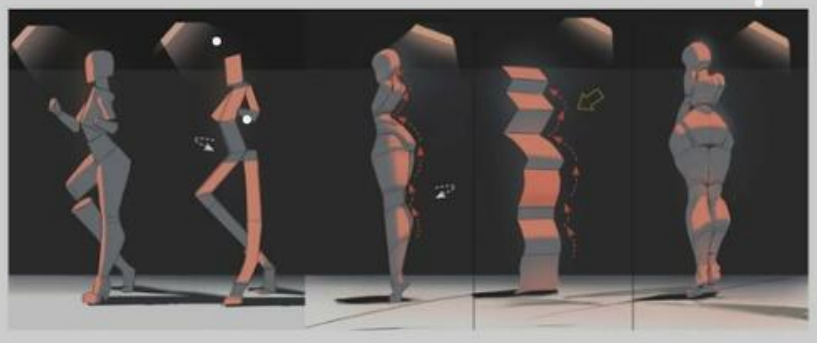
Schematic diagram of the regular change of color gradation (without considering the attenuation of light)

Based on this rule, we can make a light and shadow measuring device to calculate the relationship between the light-receiving angle and the light-receiving rate.

Fold a napkin to make creases at different angles, and do an experiment under the light, and the same law of light and shadow changes will be obtained.



When painting, you can imagine the transition of the object structure as napkins with different crease angles, so as to It will better grasp the rhythm of the entire light and shadow changes.



01 The first step in lighting an object is to outline the shape,

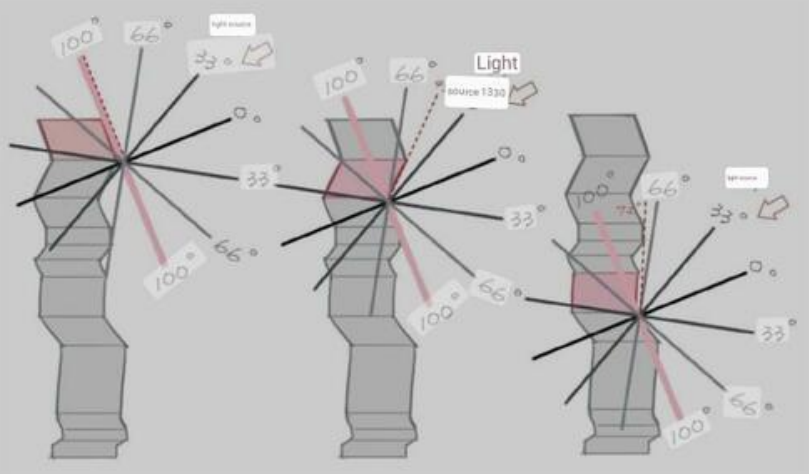
That is, block complex structures.

02 After generalizing the body shape, it is easy to find the turning line of the structure, which greatly reduces the difficulty of lighting

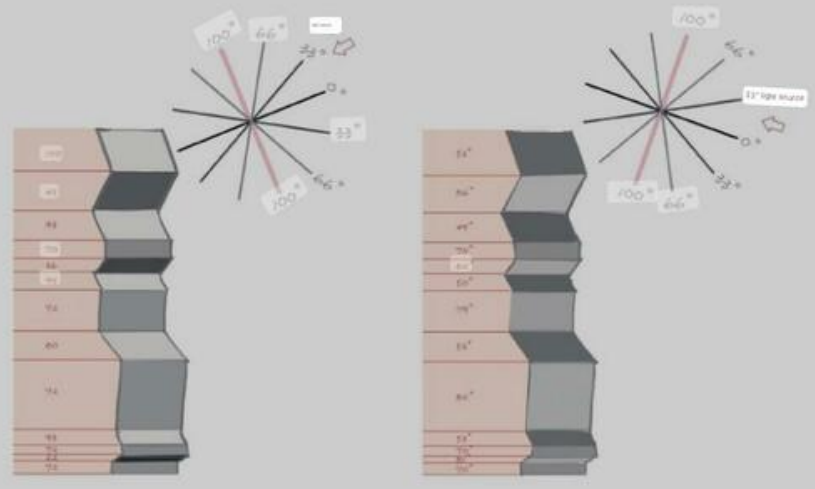
Every time

03 Copy the turning line to get a piece of paper with turning rhythm.

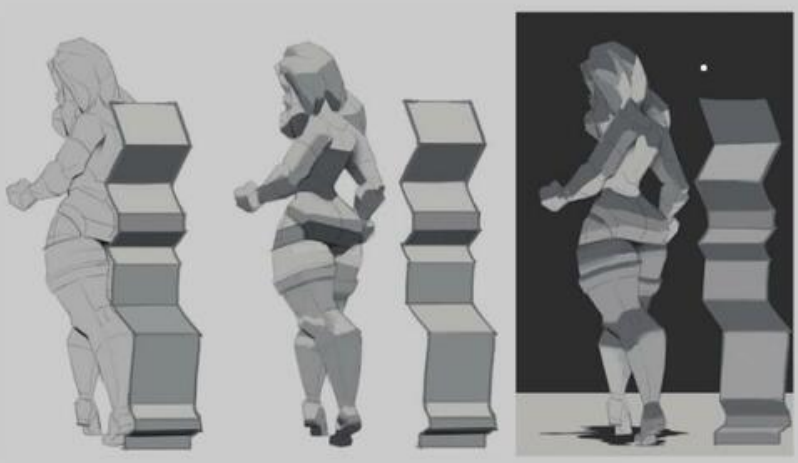
04 Use the light and shadow calculator to accurately calculate the value of light and shadow tones on different sides.



05 Use the light and shadow calculator to easily calculate the light and shade values of light source tones at different angles.



06 After obtaining different light and shadow values, directly correspond to the human body to be illuminated, and a relatively accurate light and shadow human body can be obtained.

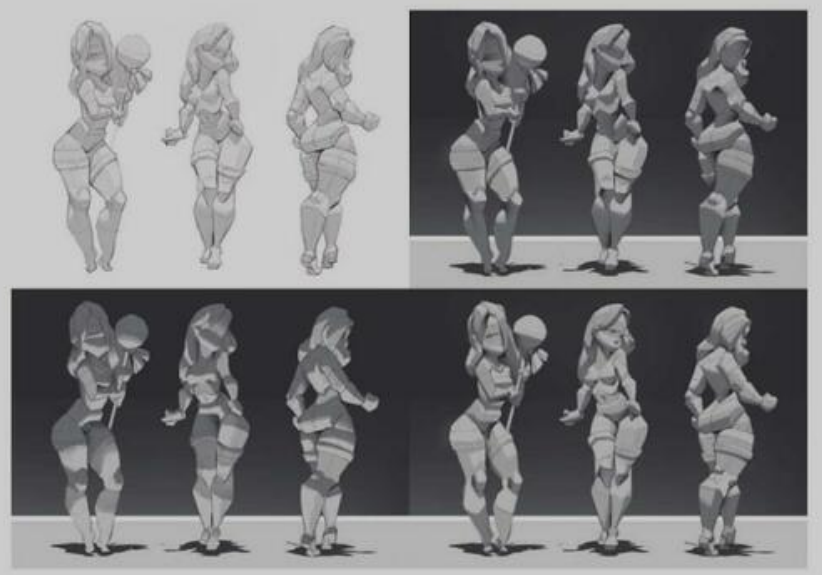


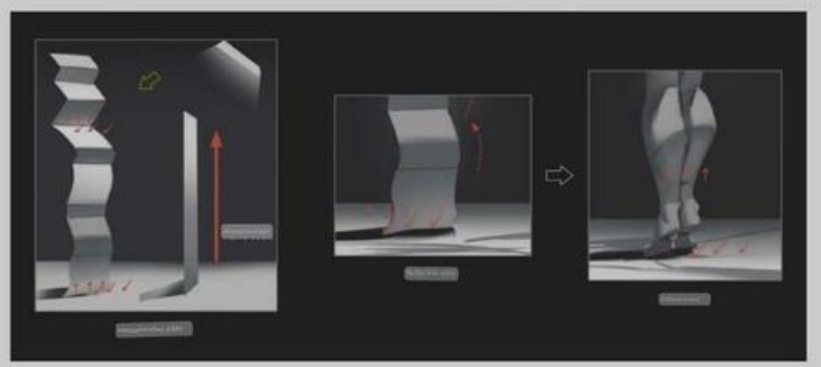
If you want to draw the human body light and shadow, there are 4 steps below.

Step 1: Draw the correct shape.

Step 2: Induction of the volume on the correct shape.

Step 3: According to different light and shadow angles, use the light and shadow calculator to calculate different brightness dark value. Step 4: Correspond the obtained light and shade values to all surfaces of the human body, and complete the rough body light and shadow of the human body.





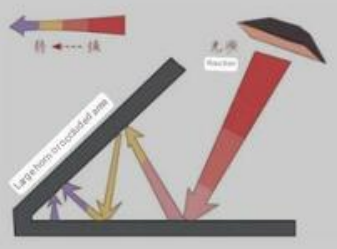
After learning the above knowledge of light and shadow, we can adjust the angle according to the direction of the light on the surface of the human body.

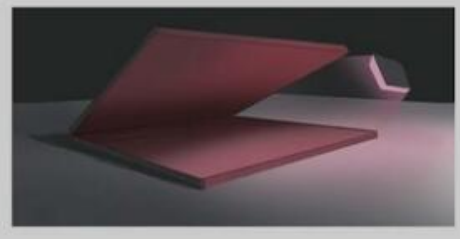
Different clearly express the light and shade of the human body, and draw rich tones.

Speaking of light and shade, here we have to explain the concept of "occlusion" in detail.

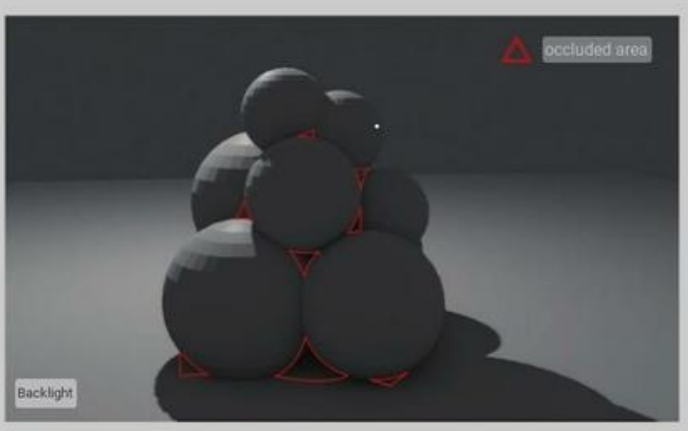
Many learners may have only heard of the three sides and the five tones, but in actual painting, "occlusion" is also a very important concept.

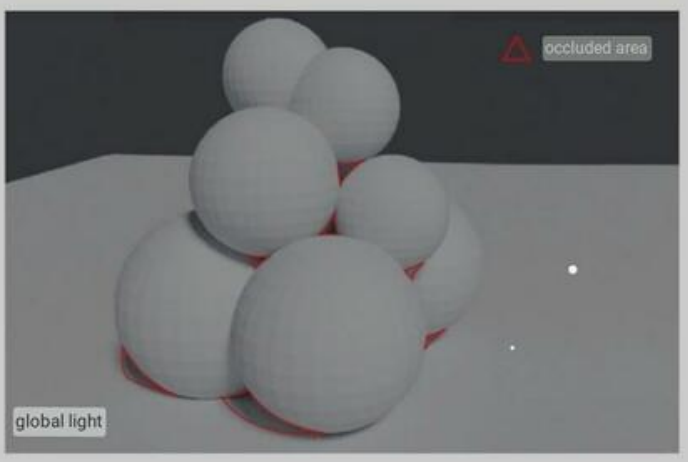
Simply put, when objects are close enough to each other, the light is blocked, and occluded shadow areas will appear even if the objects are not actually touching.

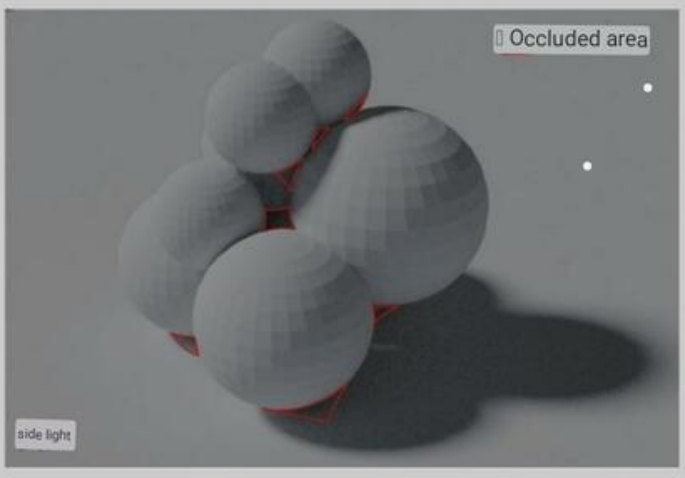




The three figures below show the occluded shadow areas formed at different angles and under different light sources, respectively. Carefully observe the dark parts of these objects, you will find that the tones at the corners of each object (see the red area) are the deepest in the picture, and the deepest areas of these tones are the occluded shadow areas.







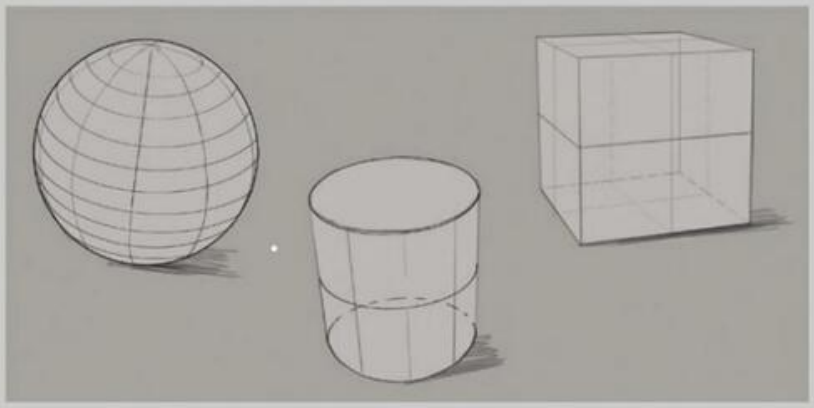
The concept of "occlusion" is applied to the shaping of human body light and shadow, as shown below.

8.2 Shaping of light and shadow

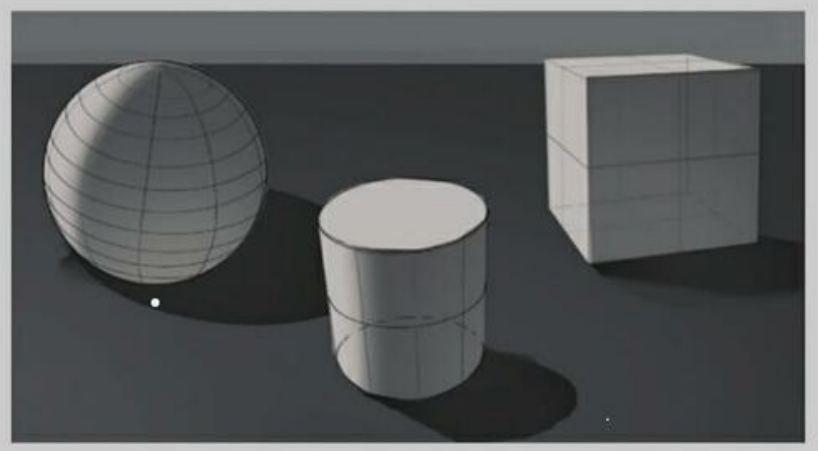
In this section, we learn how to start with geometry, summarize the human body by modeling light and shadow on simple spheres, cylinders and cubes, and then learn how to shape light and shadow by comparing shapes and light and shadow renderings.

8.2.1 Spatial geometry

Sketching is to draw light and shadow, but in order to draw the correct light and shadow, we must grasp the concept of volume behind the object. Shaping light and shadow starts from understanding the geometry of space.



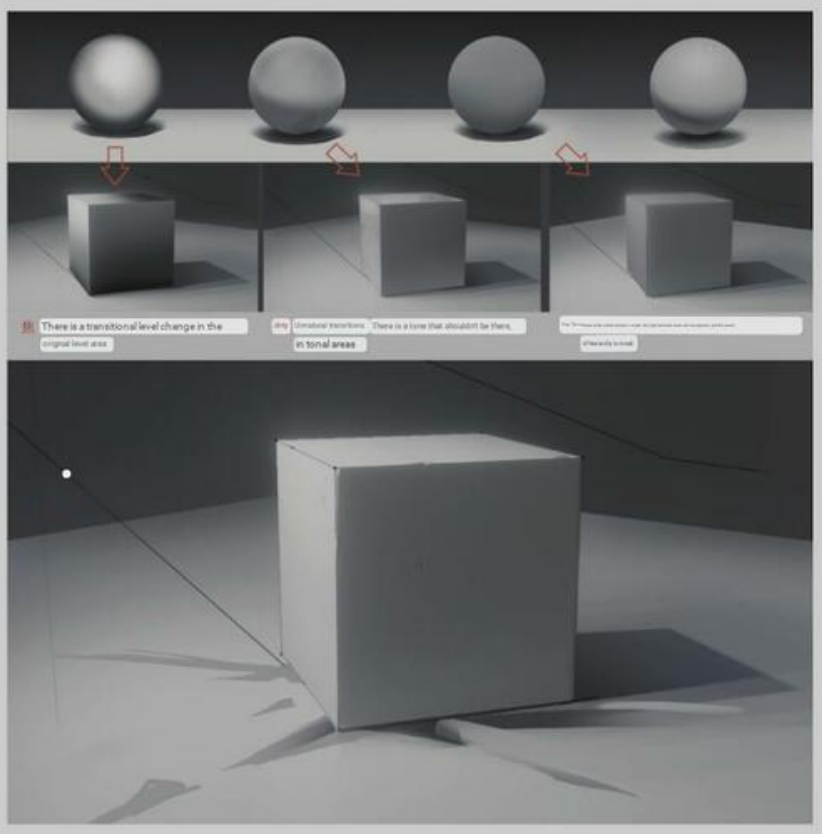
Volume Concept Map



Light and shadow concept map

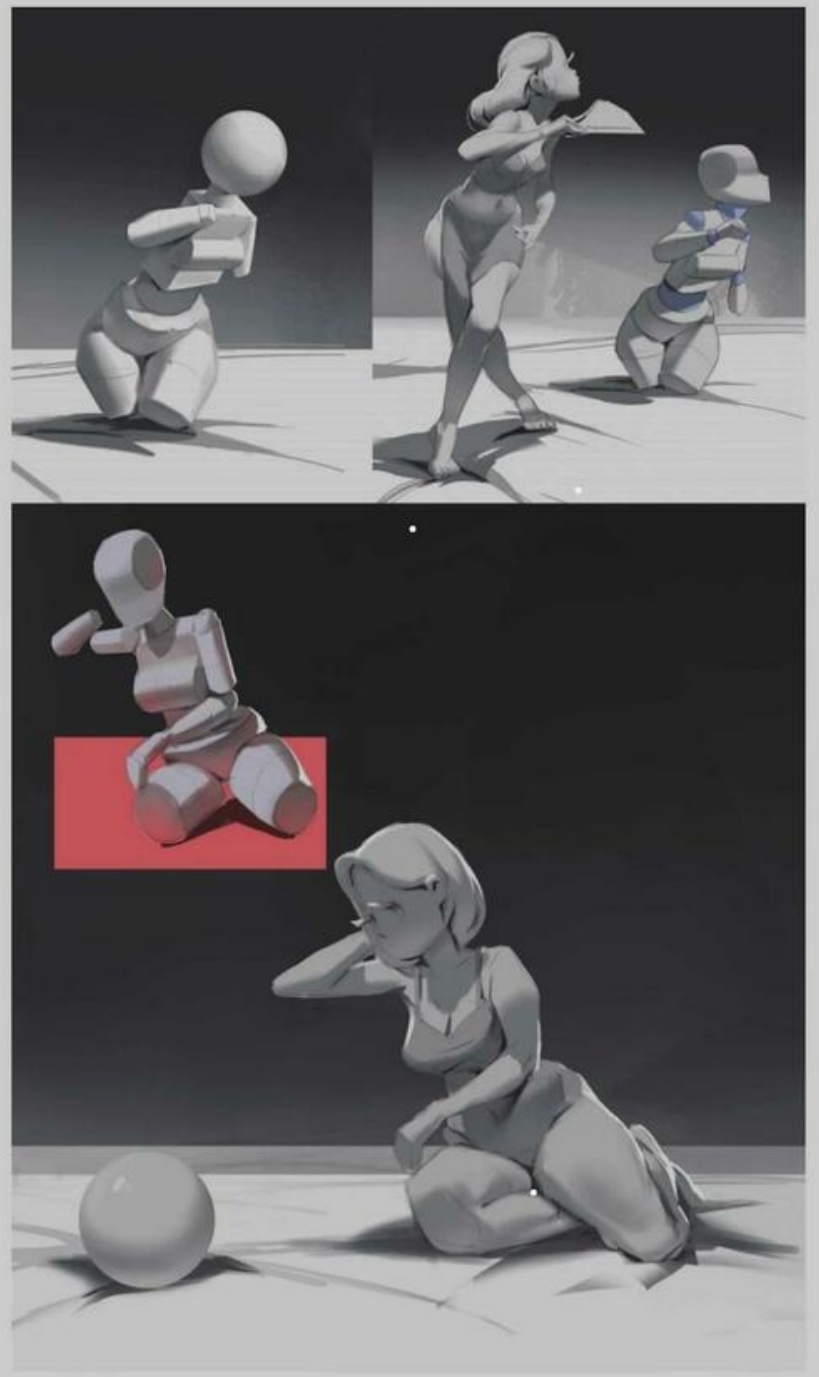
The structure line in the volume concept map will affect the light and shadow tone in the light and shadow concept map, and the light-dark boundary line will follow the trend of the structure line.

Here are some easy mistakes to make when practicing light and shadow in basic sketching.



After learning the light and shadow shaping of simple geometry, let's compare the simple geometry with the human body.

Combined, the use of geometry to create a three-dimensional sense of the human body.

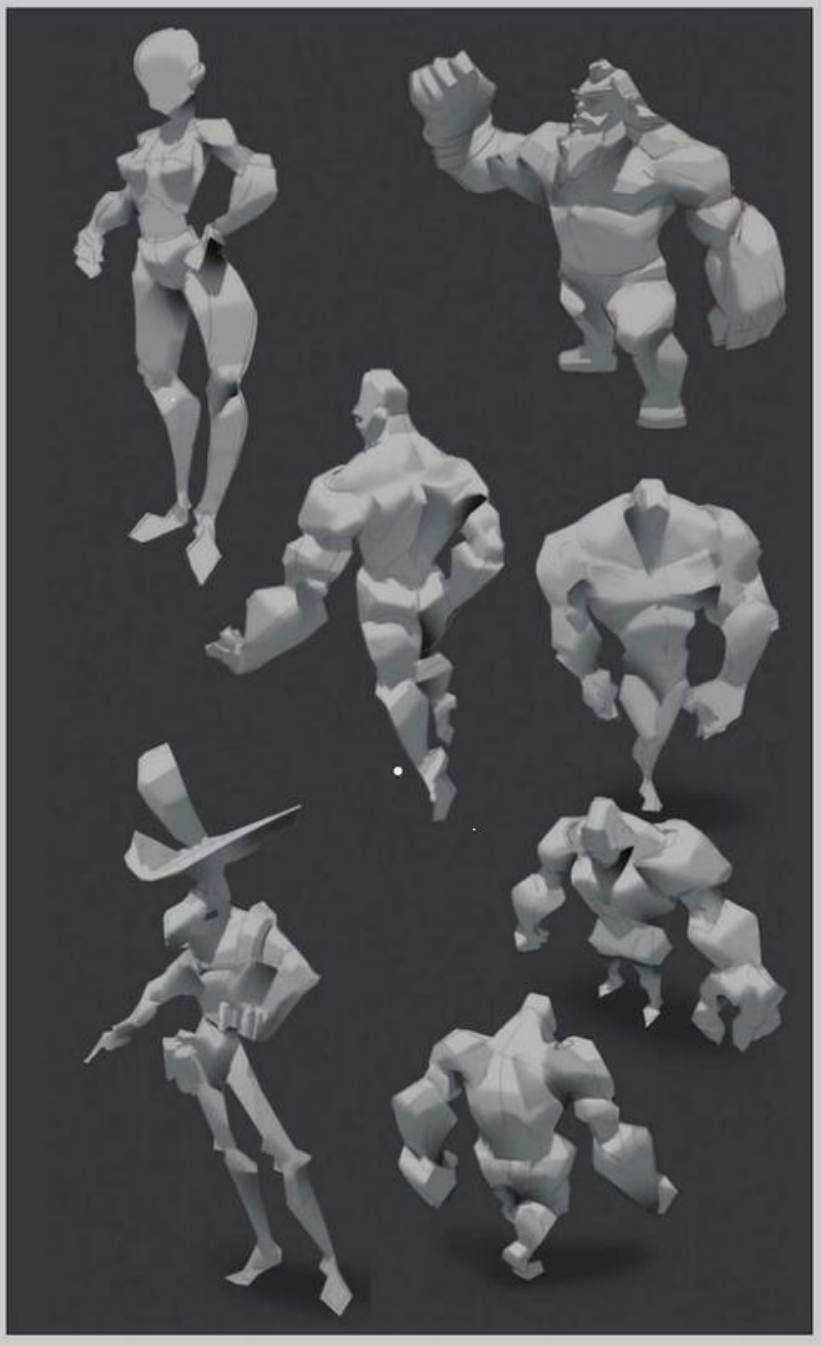


hint

It is the key to first show the relationship between large blocks and planes. On the basis of the relationship between large blocks and planes,

scrutinizing the light and shadow changes of the fine structure can make the picture dense and dense.

- Lighting and shadowing using simple geometry can also represent the muscle mass shown below.



Below, we use an example to demonstrate how to shape human light and shadow.

01 Set a light source direction for the basic drawn human body, and then do the basic coloring.

02 Before shaping the light and shadow of the human body, make a rough sketch on the puppet composed of simple geometry

Summarize and analyze the light and dark, so that we can clarify our thinking.

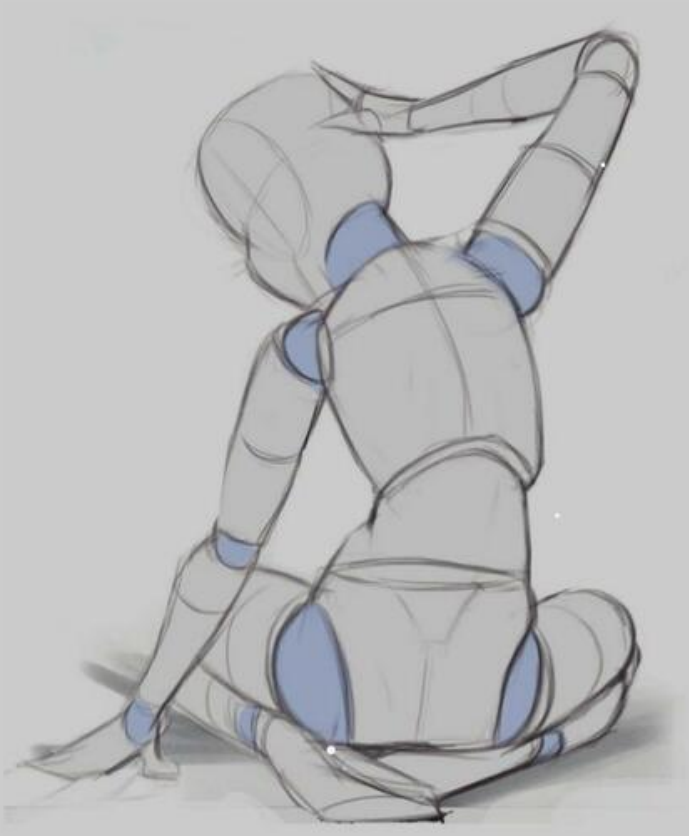
03 On the basis of the analysis in the previous step, complete light and shadow shaping of the human

04

After understanding the relationship between structure and light and shadow, you can try to change the direction of the light source for light and shadow modeling

make.

In actual painting, we can first draw a human model with a strong three-dimensional structure and joints, and then express the figure on the basis of it, and then shape the light and shadow of the human body on the basis of the figure.



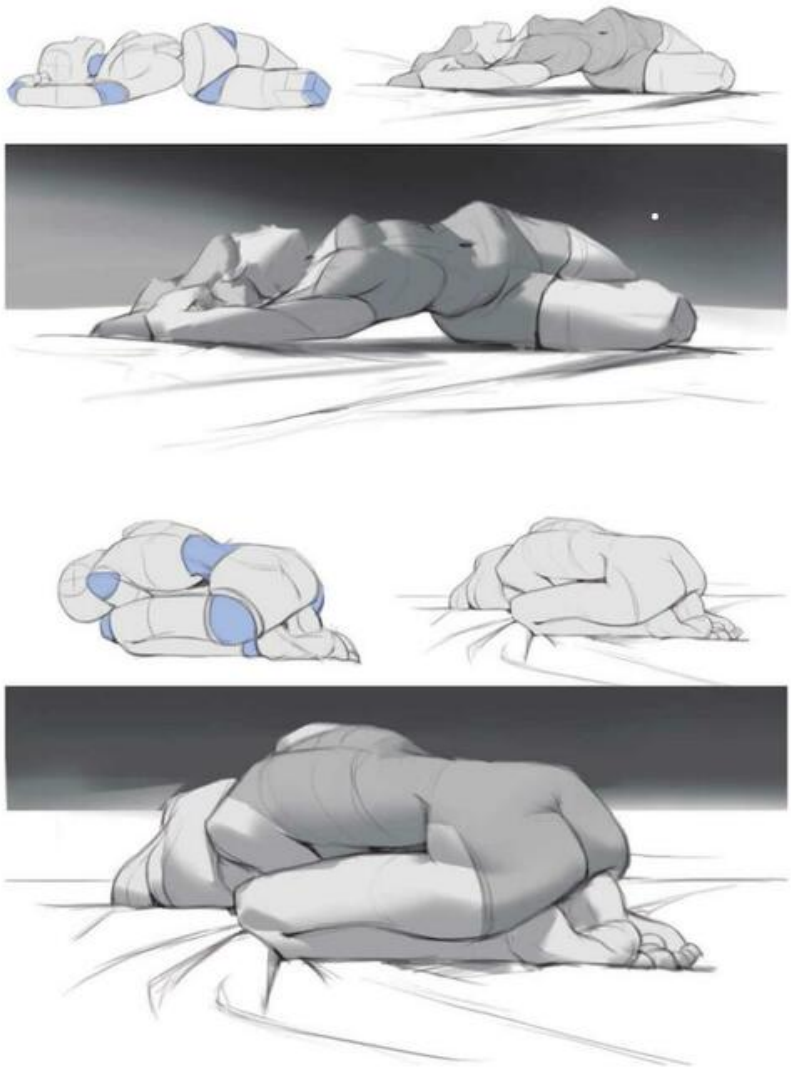
Structural joint man

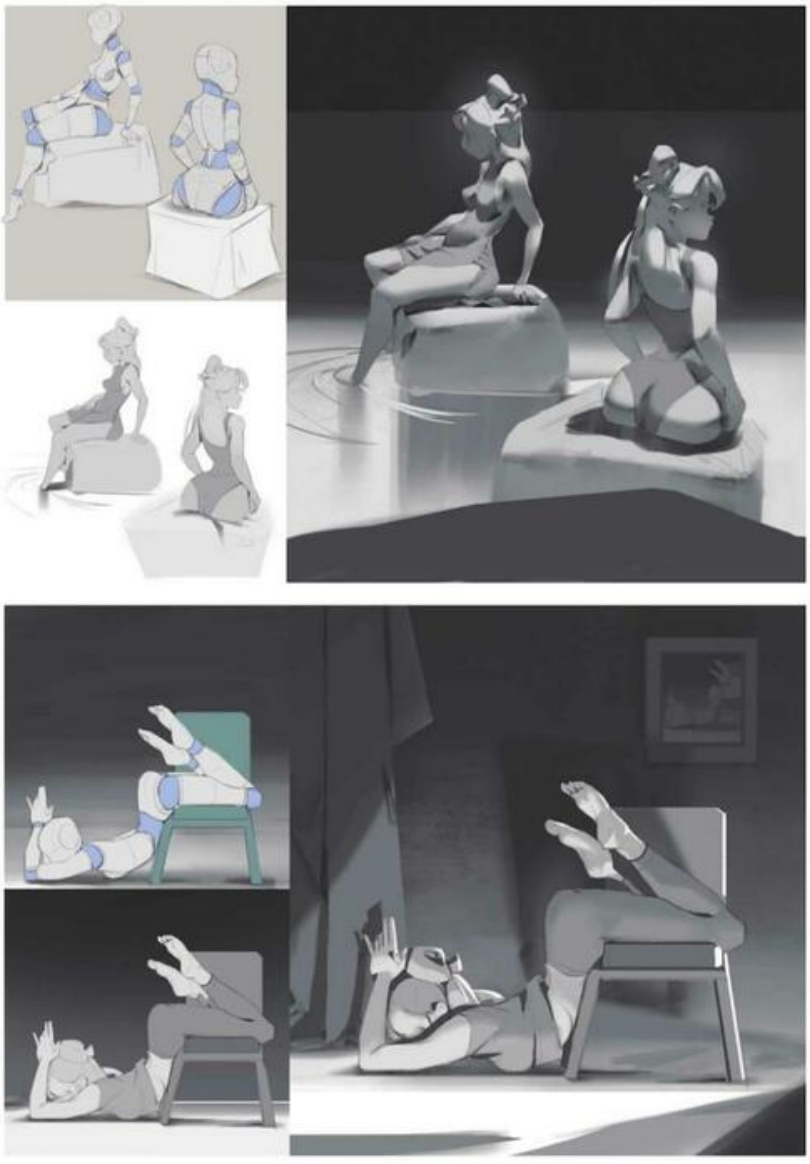
figure

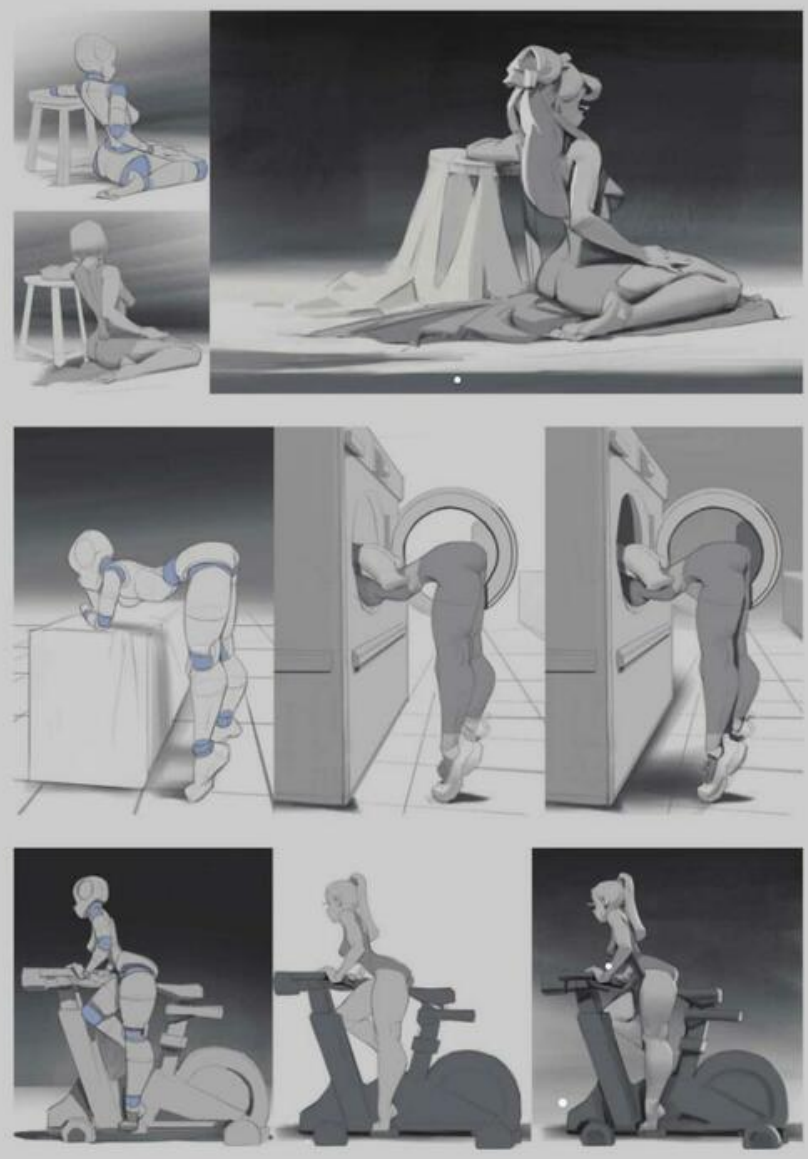
Light and shadow shaping effect

According to the above painting logic, we can show more different poses and different light source conditions

Human body under light and shadow.

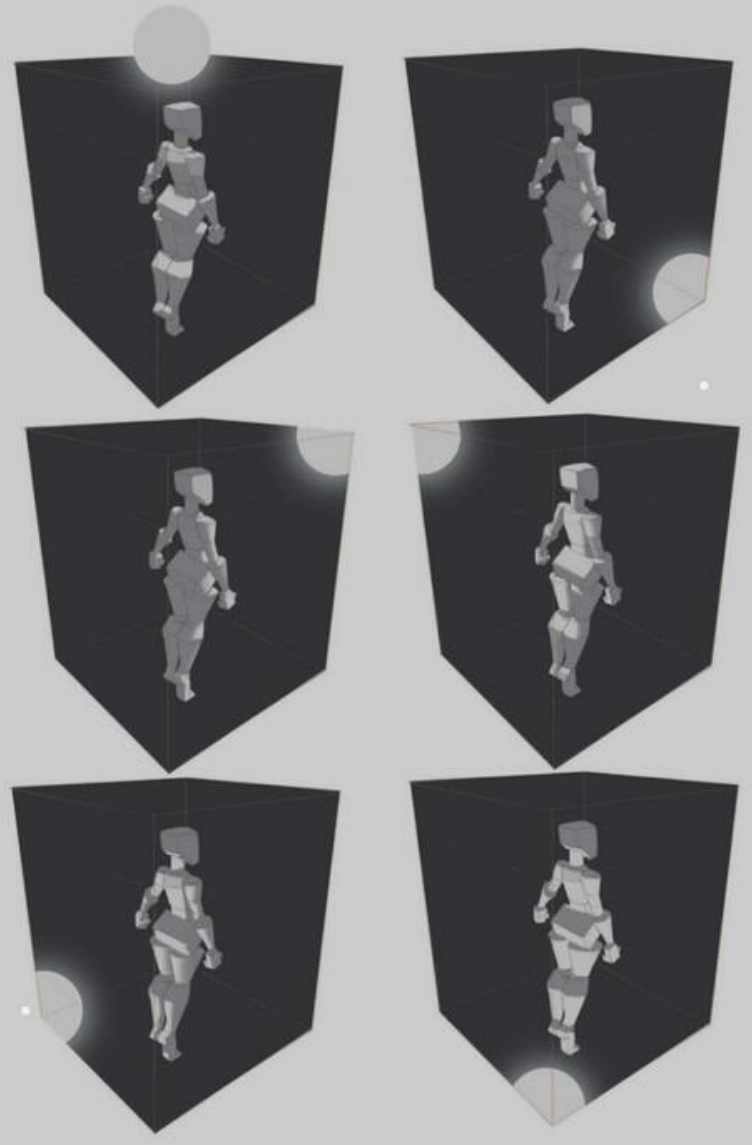






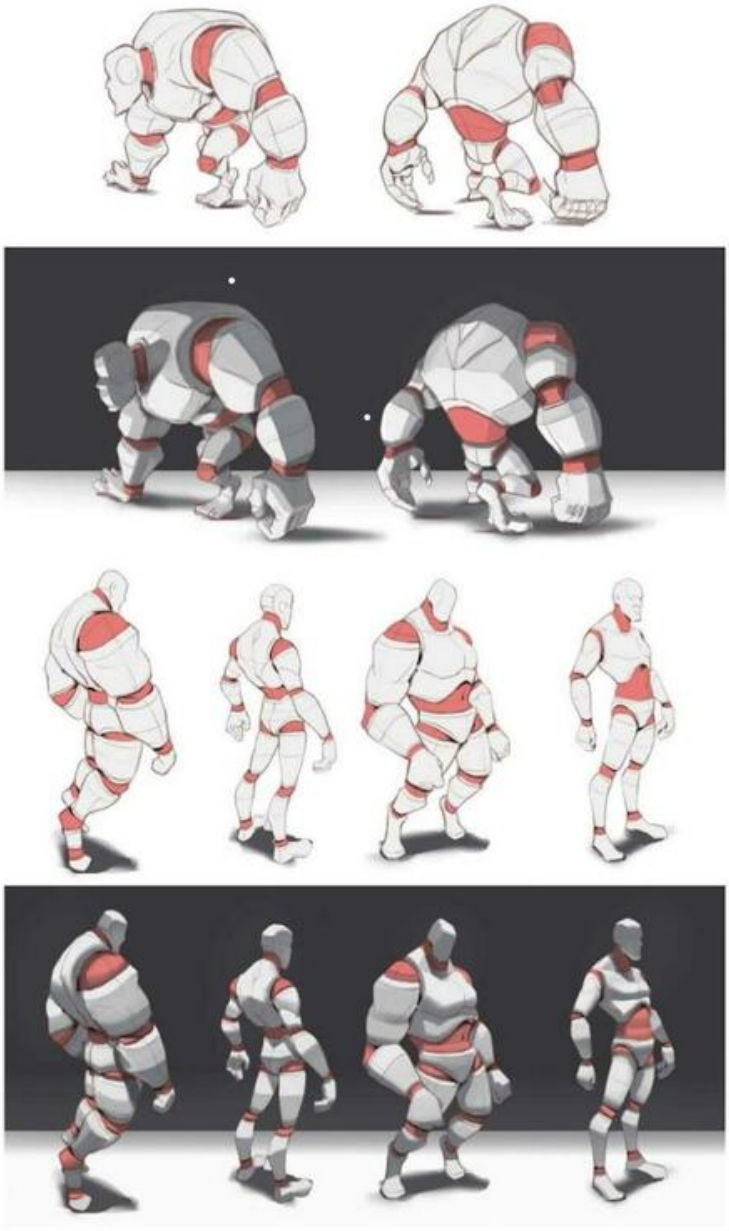
8.2.2 Light and shadow performance of human body under different light sources

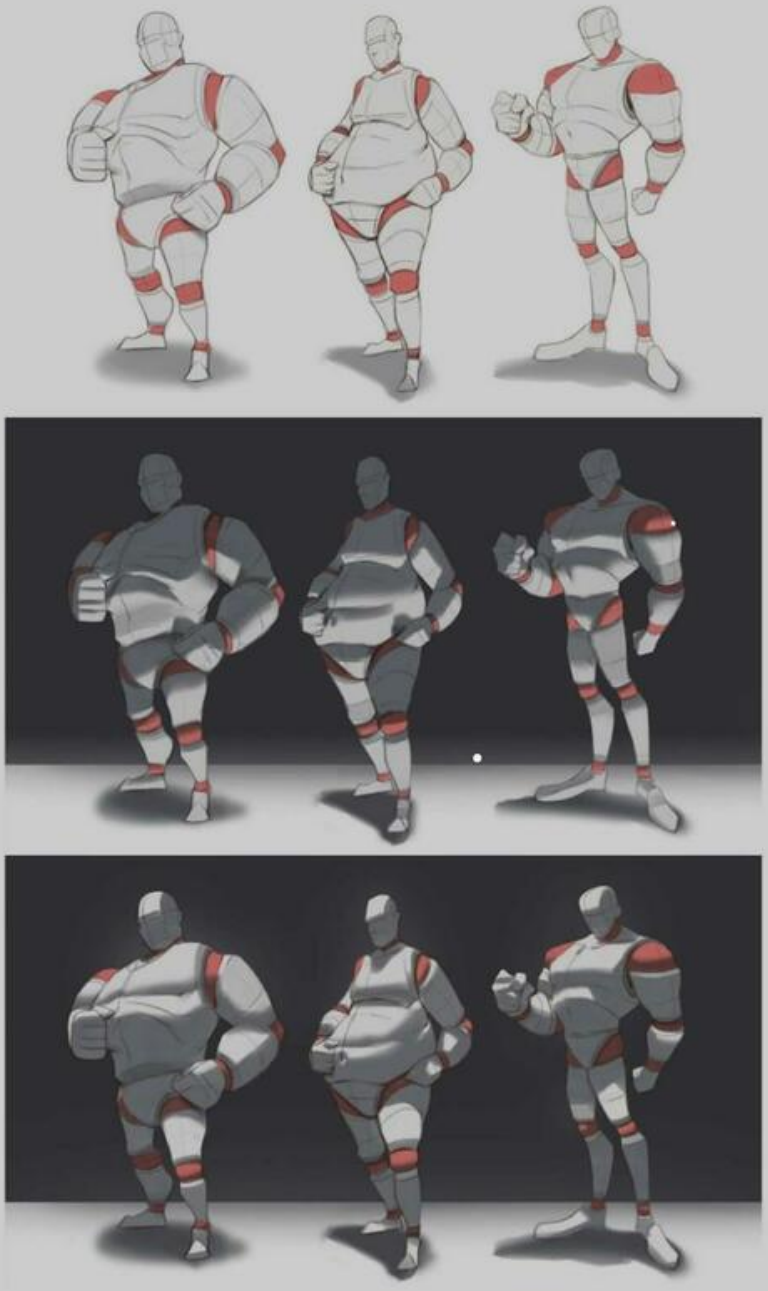
After learning the knowledge in the previous section, everyone has a certain understanding of light and shadow shaping. Below, we conduct an in-depth analysis of the light and shadow of the human body according to the different directions of light receiving, so as to further grasp the influence of light sources in different directions on the effect of light and shadow on the human body.



We can set a light source direction on the basis of the structural joint, and then

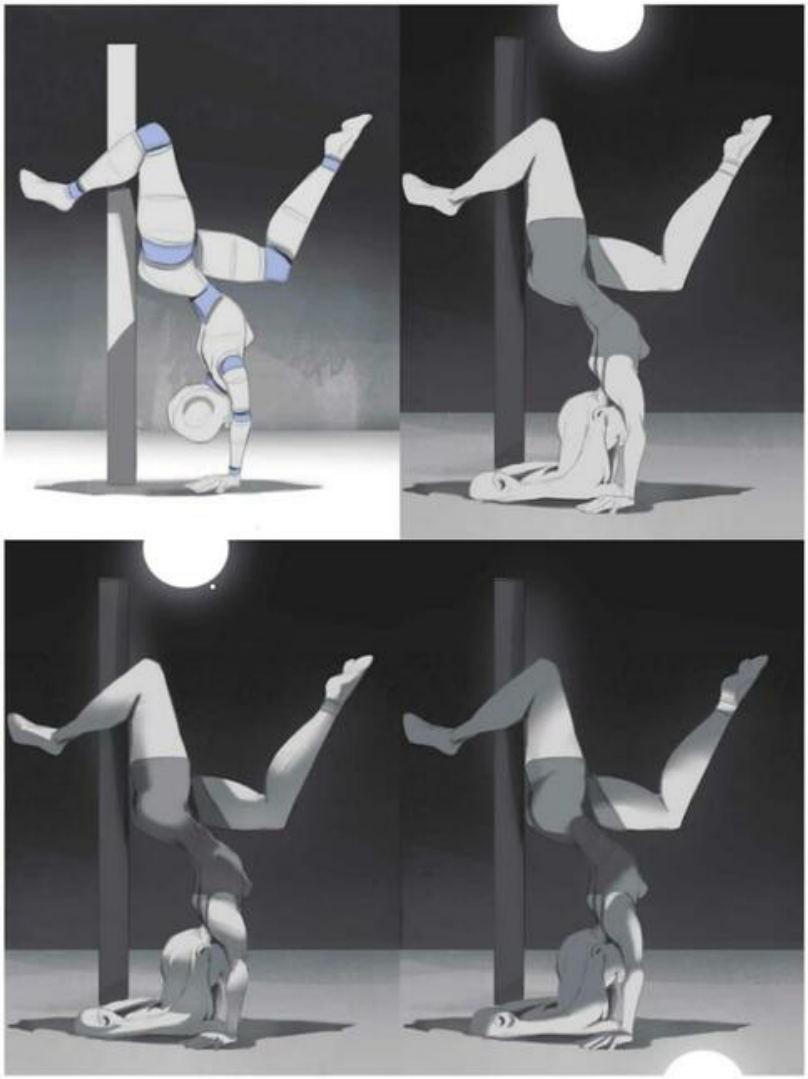
Light-receiving analysis.

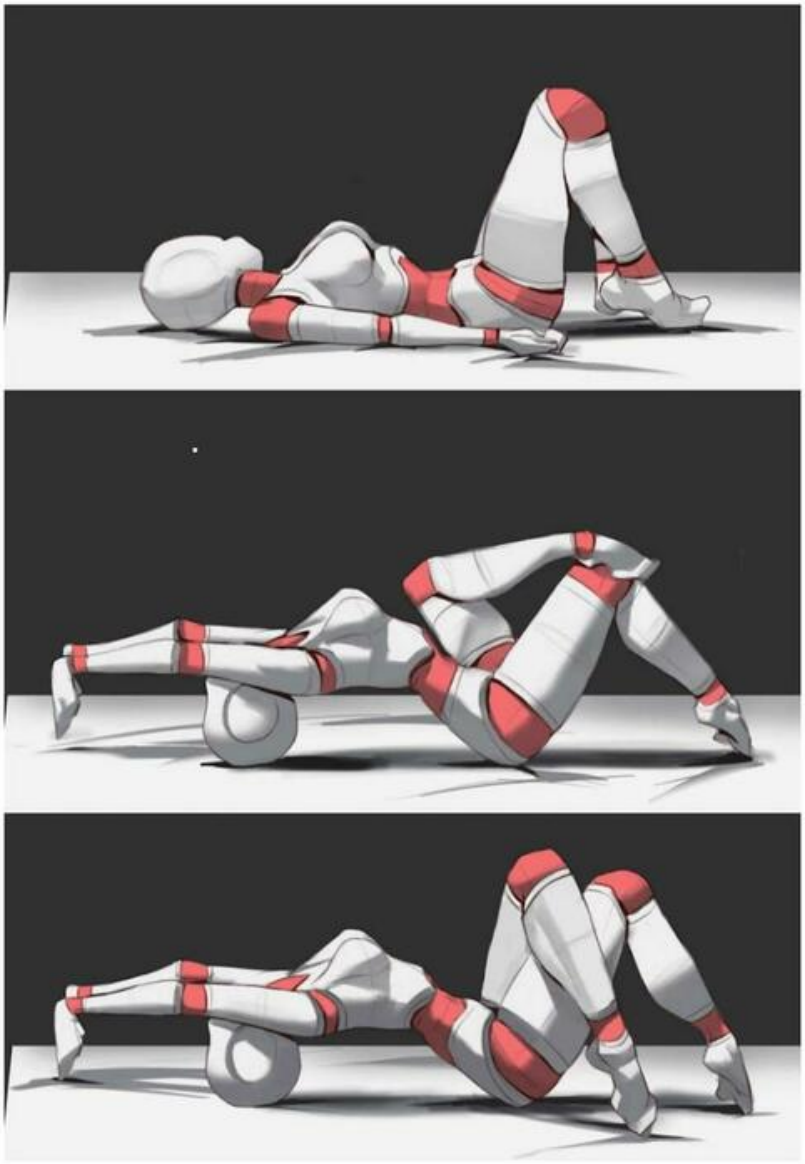


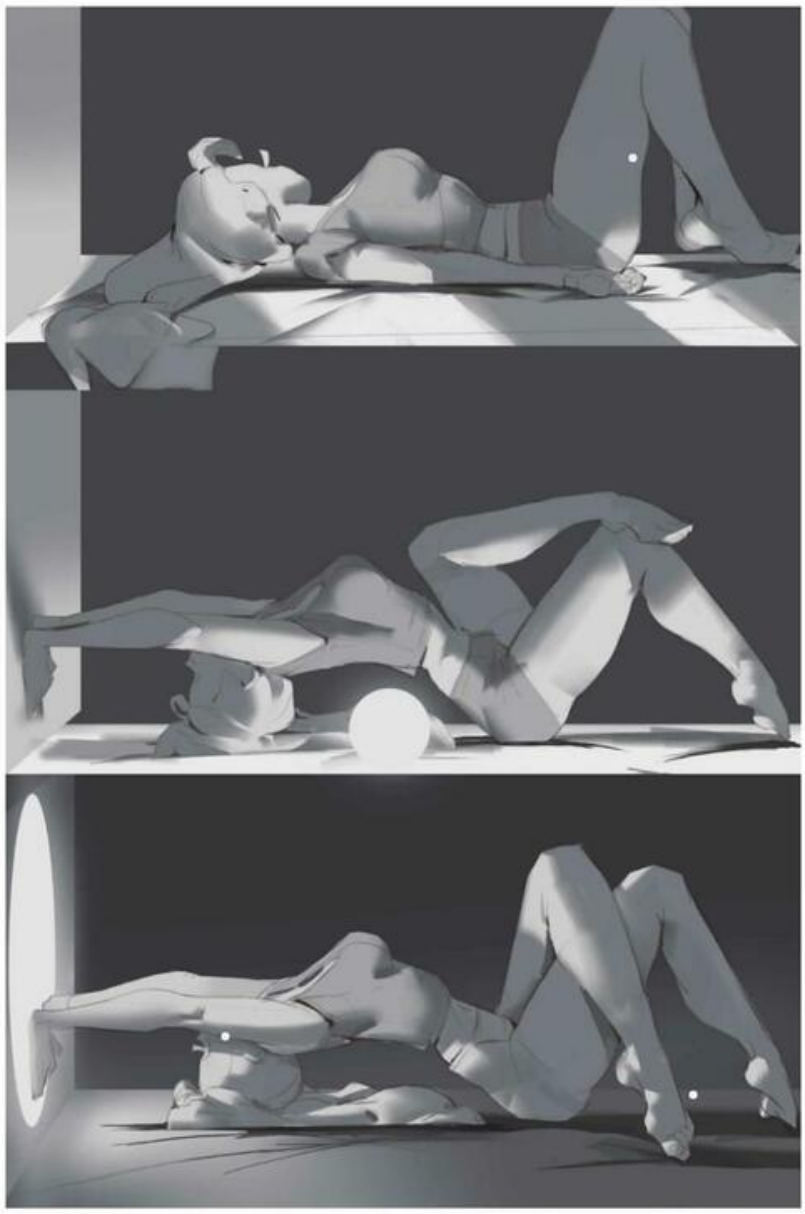


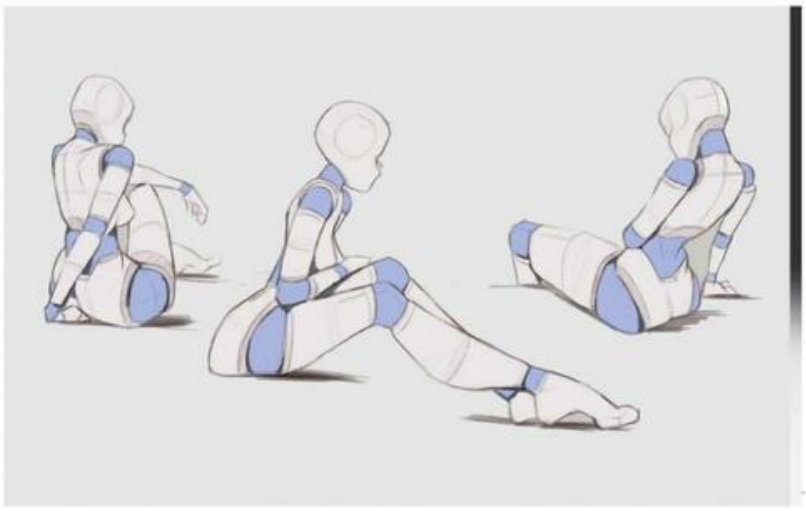
The light and shadow effects of the same structure, joints and characters under different light source directions are as follows:

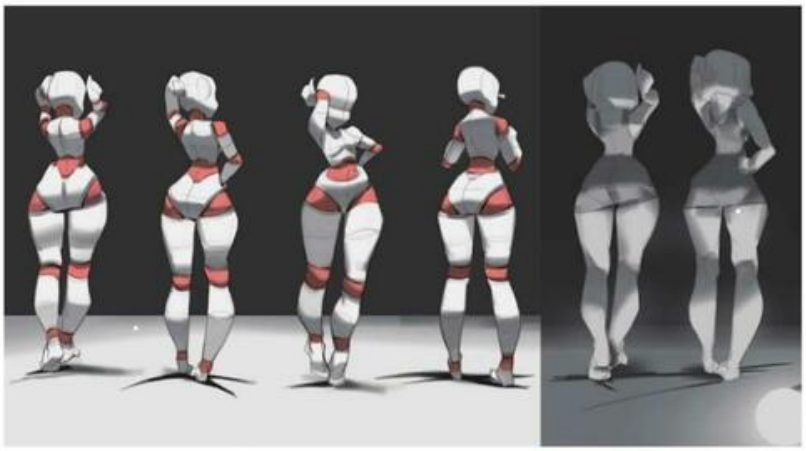
Down.

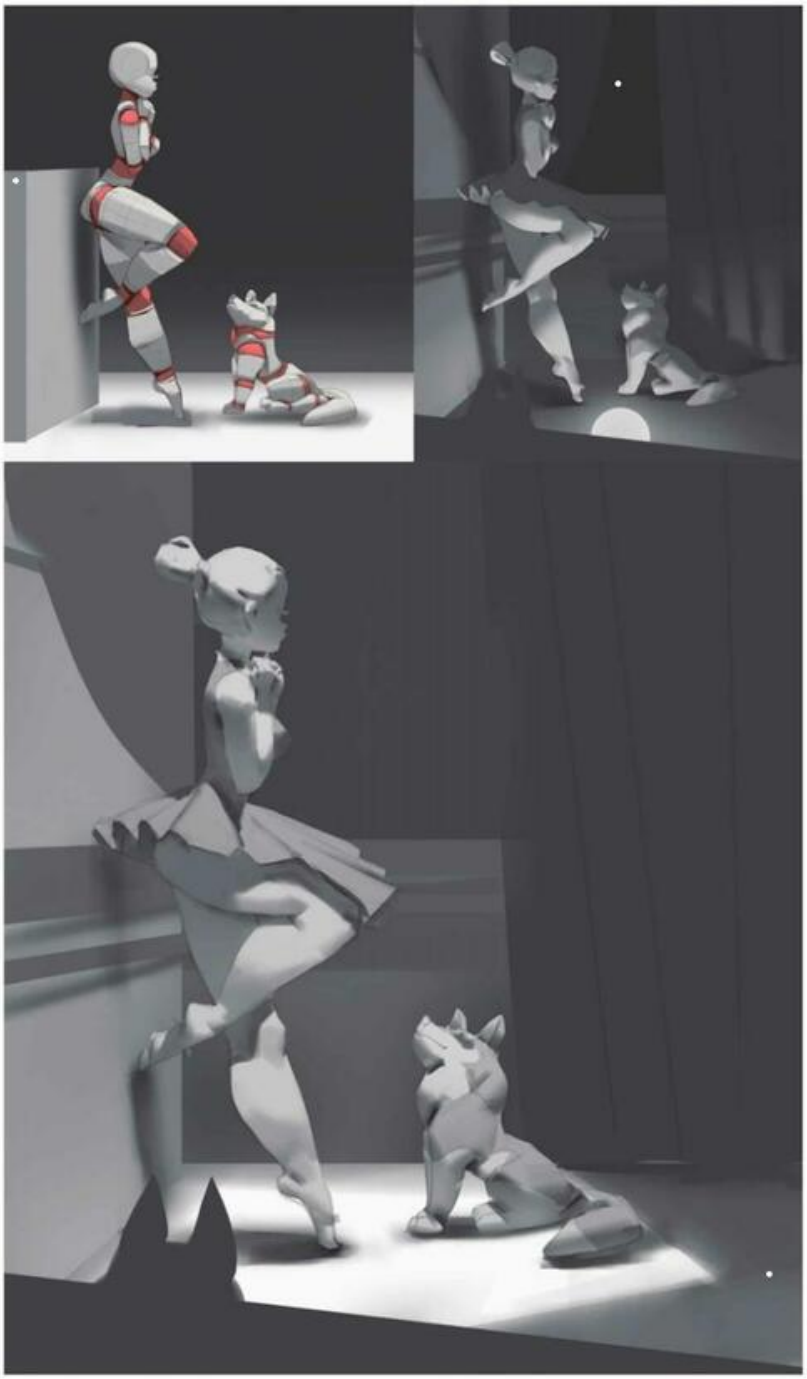


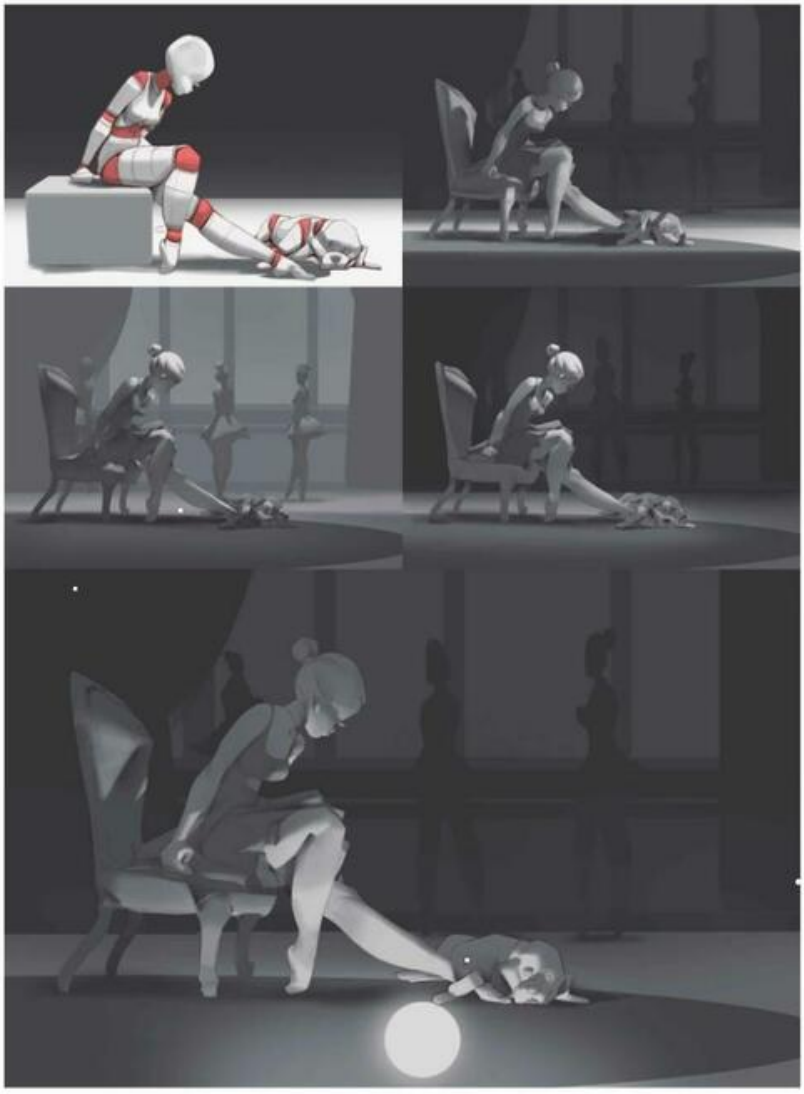


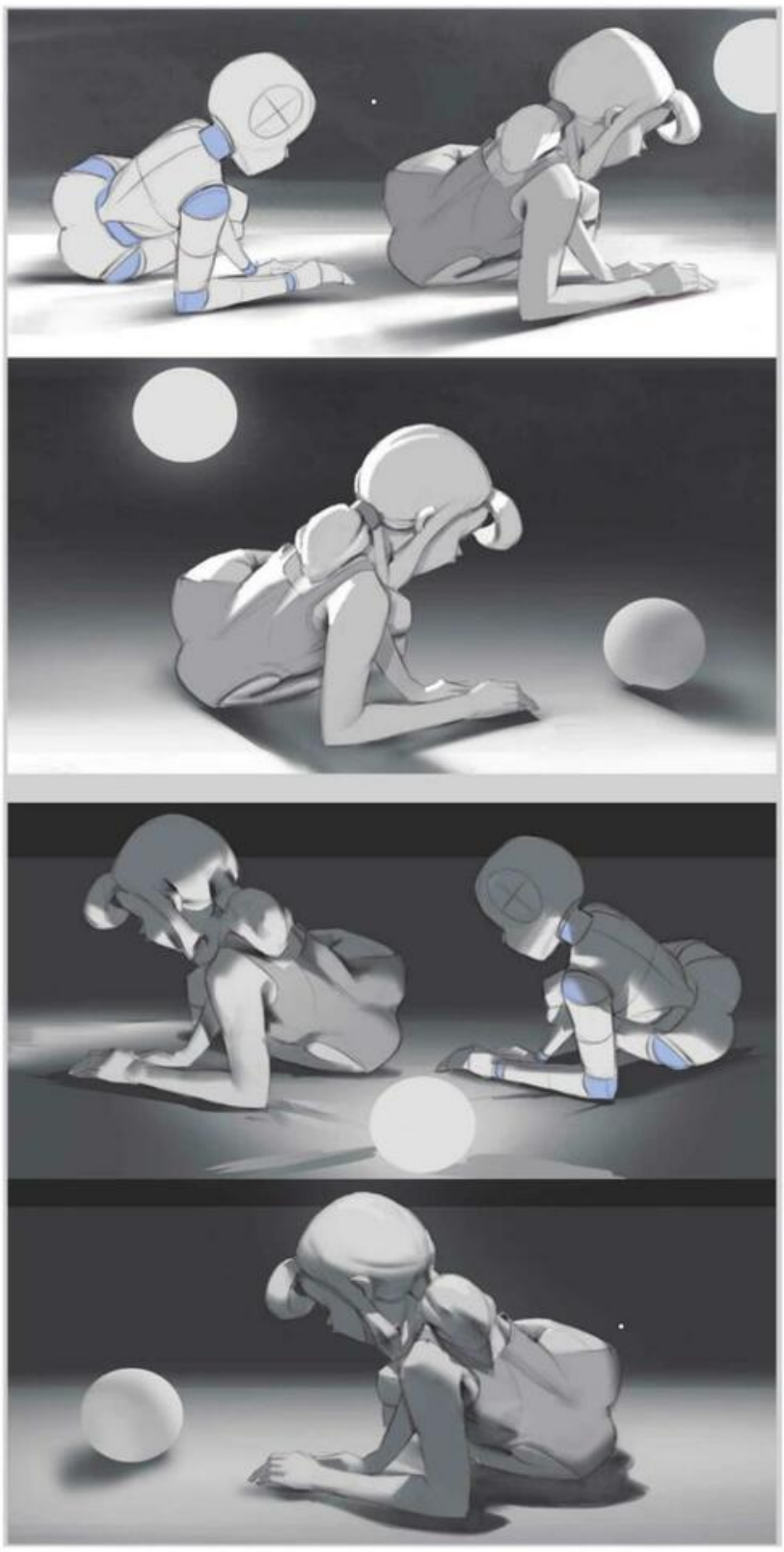












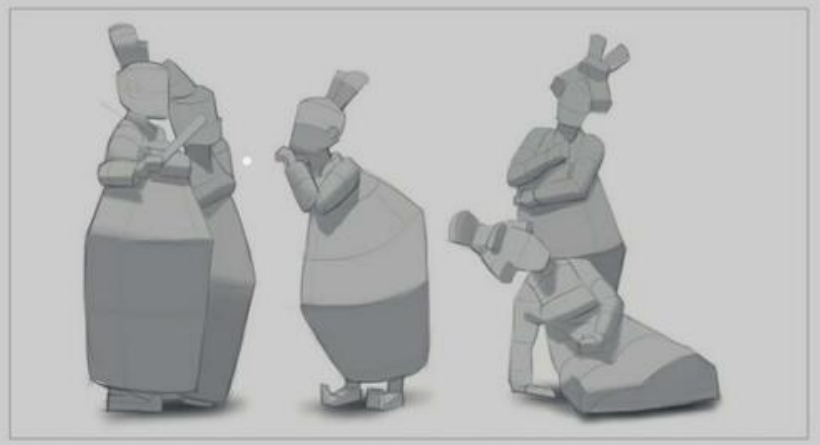
8.3 Instance performance and analysis of light and shadow

In actual painting, we should be accustomed to applying the knowledge we have learned throughout our own painting process, develop good painting habits, and draw accurate light and shadow body shapes. At the same time, according to the different characters, styles, etc., the painting steps need to be finely adjusted in the actual painting process. Below, through 3 cases to demonstrate the process of light and shadow shaping, for your reference and learning.

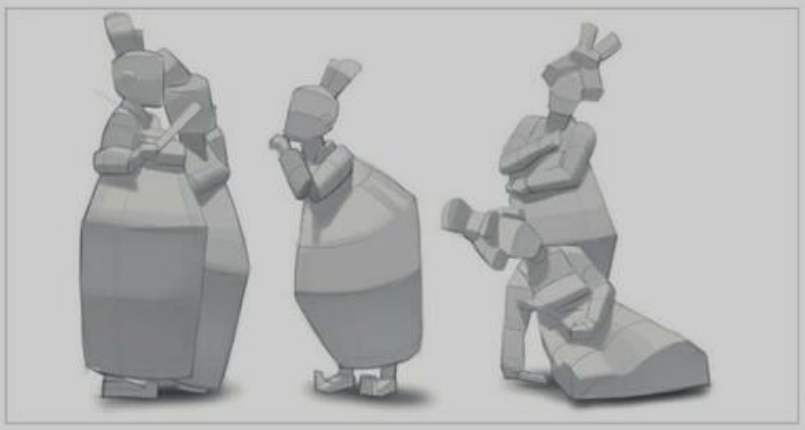
8.3.1 Light and Shadow Modeling of Tang Palace Night Banquet

01 Draw line drafts to ensure that each character is beautiful in appearance and summarizes the block surface structure.

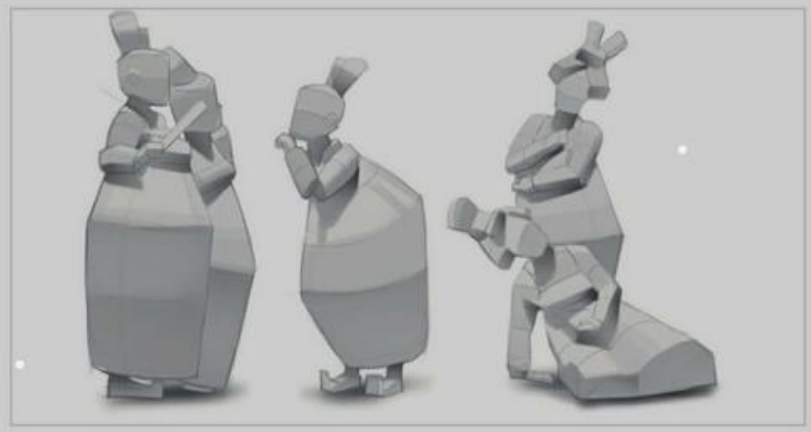
02 Analyze and determine the light and dark areas to ensure that the shape of the dark parts is uniform as a whole.



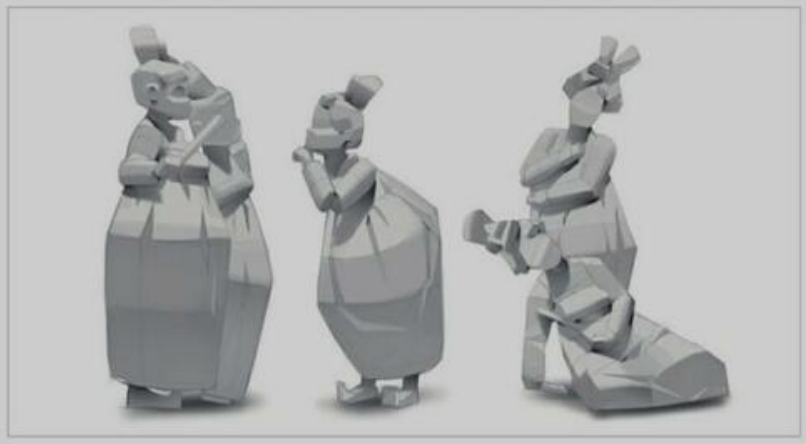
03 According to the block surface structure summarized in step 01, distinguish the gray surface in the dark area.



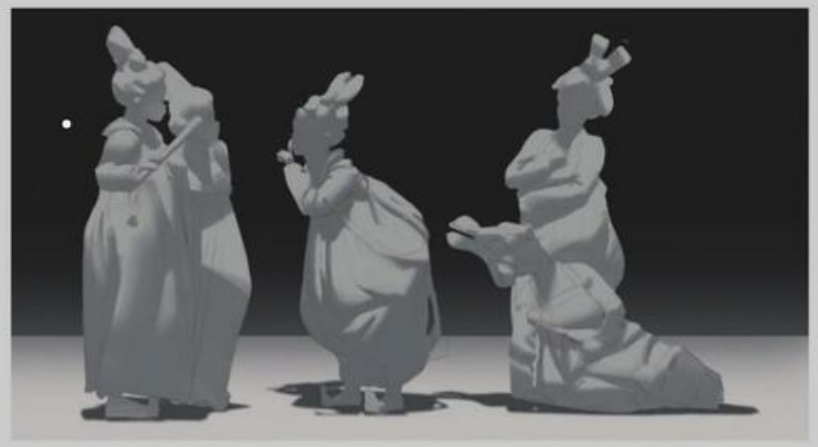
04 Draw the occluded area of the dark part.



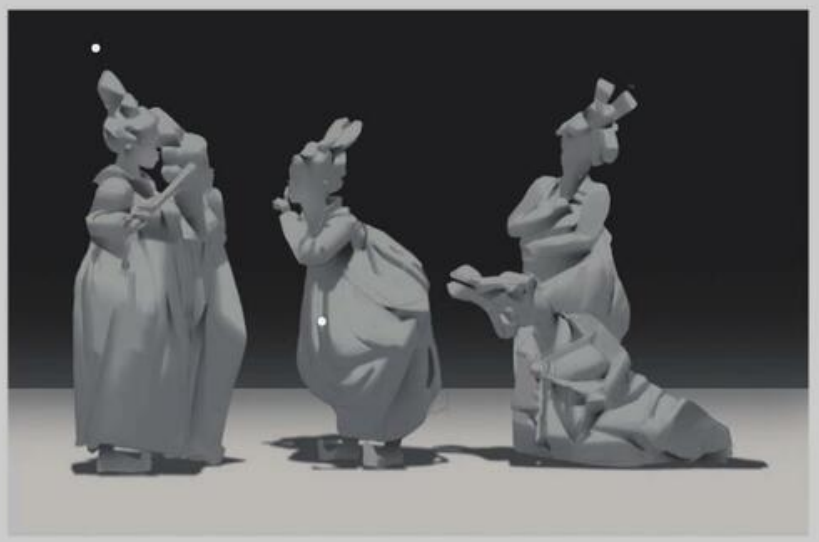
05 Add smaller structures to the human body and enrich the details of the picture.



06 add background to the screen, **Transition refinement** , to ensure that the dark part of the picture is unified and complete.



07 Dig deeper into the details.

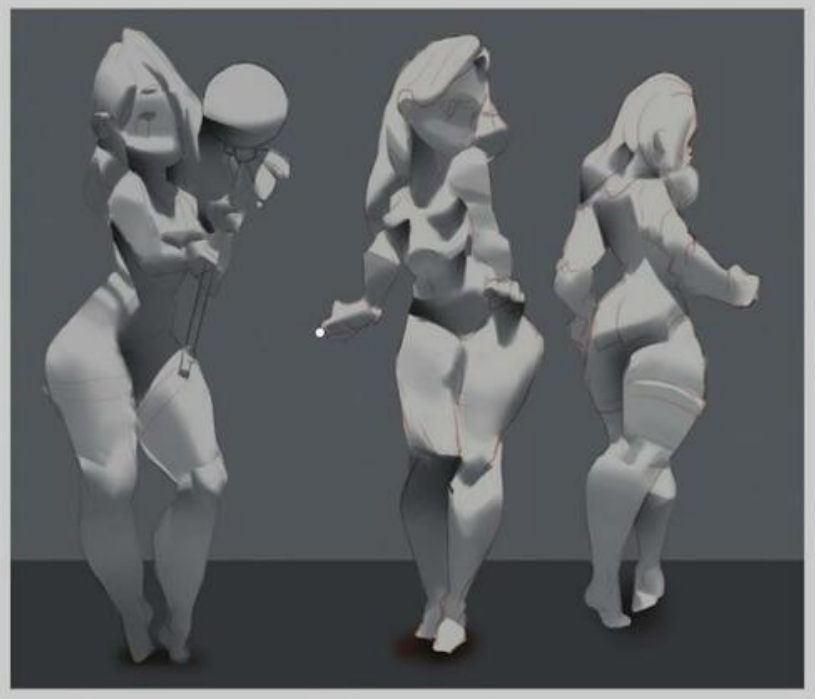


08 overlapping colors. Refine the drawing.

8.3.2 Pink girl light and shadow modeling

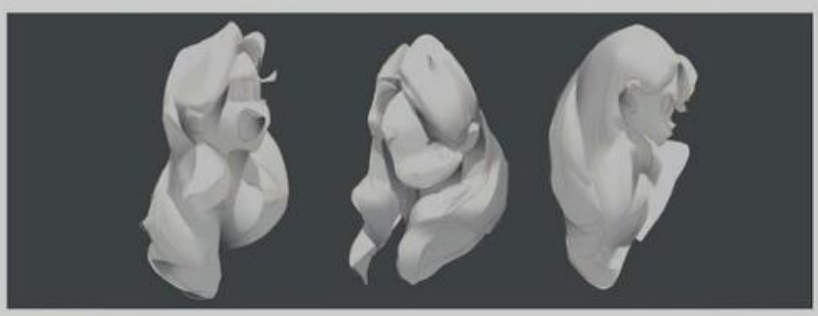
01 Draw the line art of the character and determine the basic shape of the character.

02 Draw light and shadow on the basis of the character line draft.



OE draws character expression line art.

04 Add light and shadow to the characters.



05 Layer color for the character's expression.

06 is the dynamic layering of the characters.

07 overall adjustment, Refine the drawing.

8.3.3 Light and shadow modeling for girls facing up

01 Draw the line art and determine the basic shape of the character.

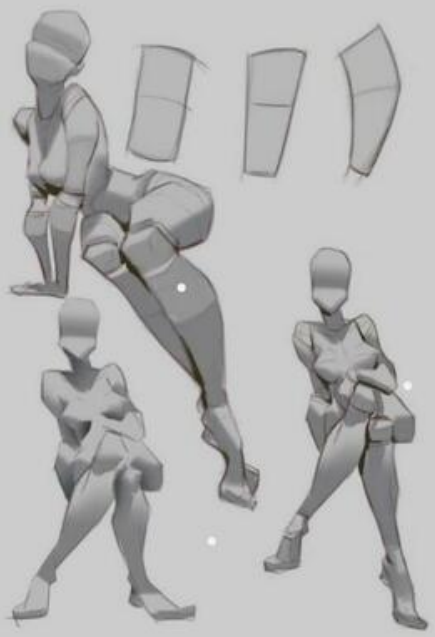
02 Roughly summarize the light and dark relationship of the human body according to the direction of the light source (the light and dark summary at this stage only needs to express two color levels, which should not be too complicated, otherwise it will affect our overall control of the picture, which will make it difficult to process the picture reasonably in the later stage).

03 Continue to describe in depth, the color tone of different materials in the human body (such as hair, clothes, etc.) differentiate.

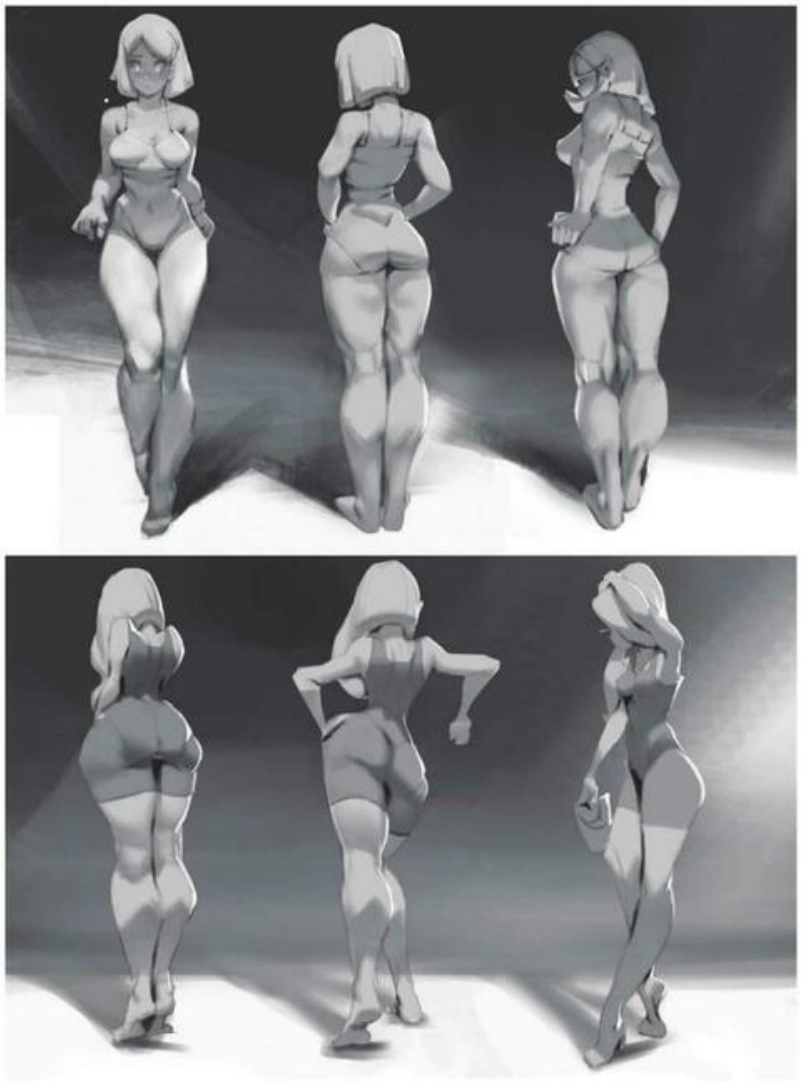
04 Refine the picture to show a more subtle structure. Unified adjustment of the screen to complete the modeling.

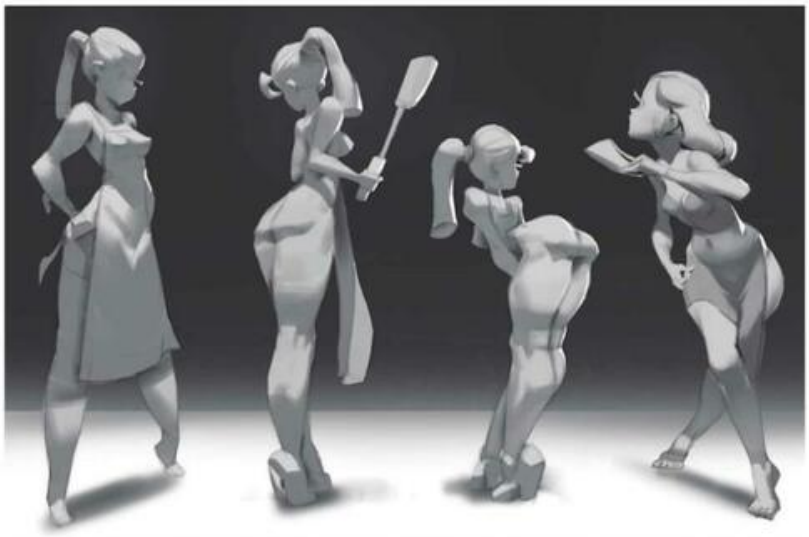
More special training

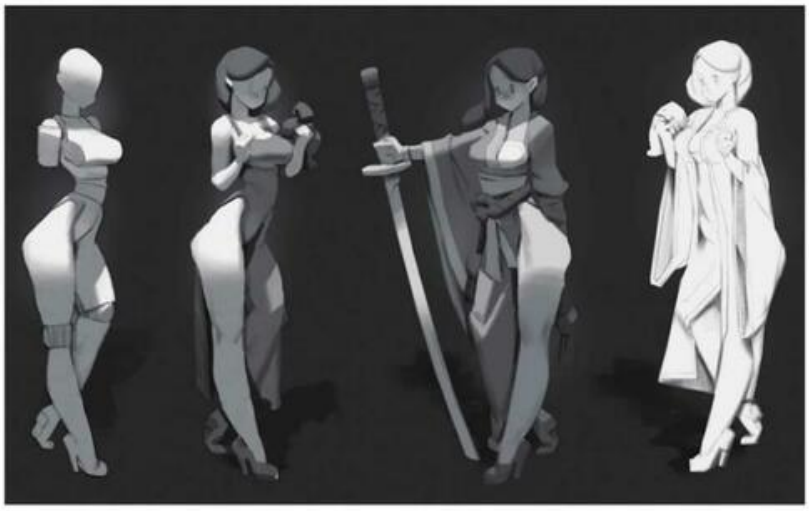
Do a set of body light and shadow shaping exercises based on the photos.

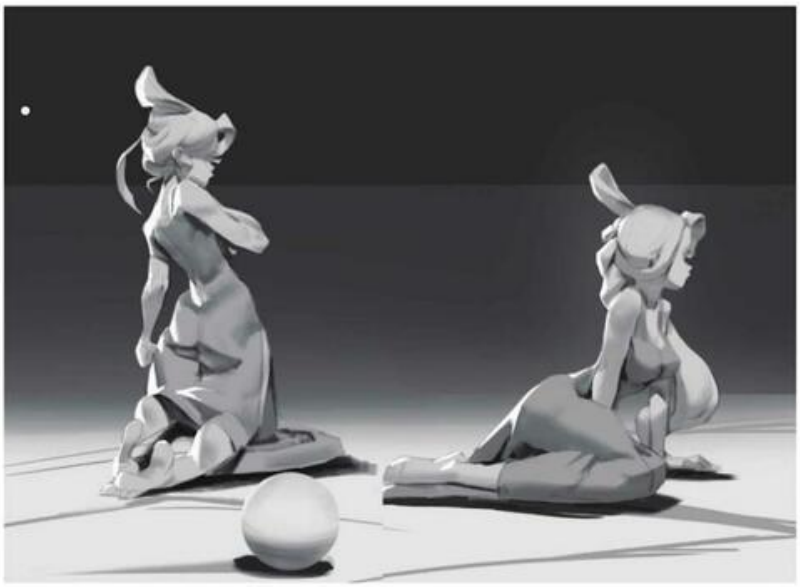


Do a set of body light and shadow shaping exercises in a top-lit environment.

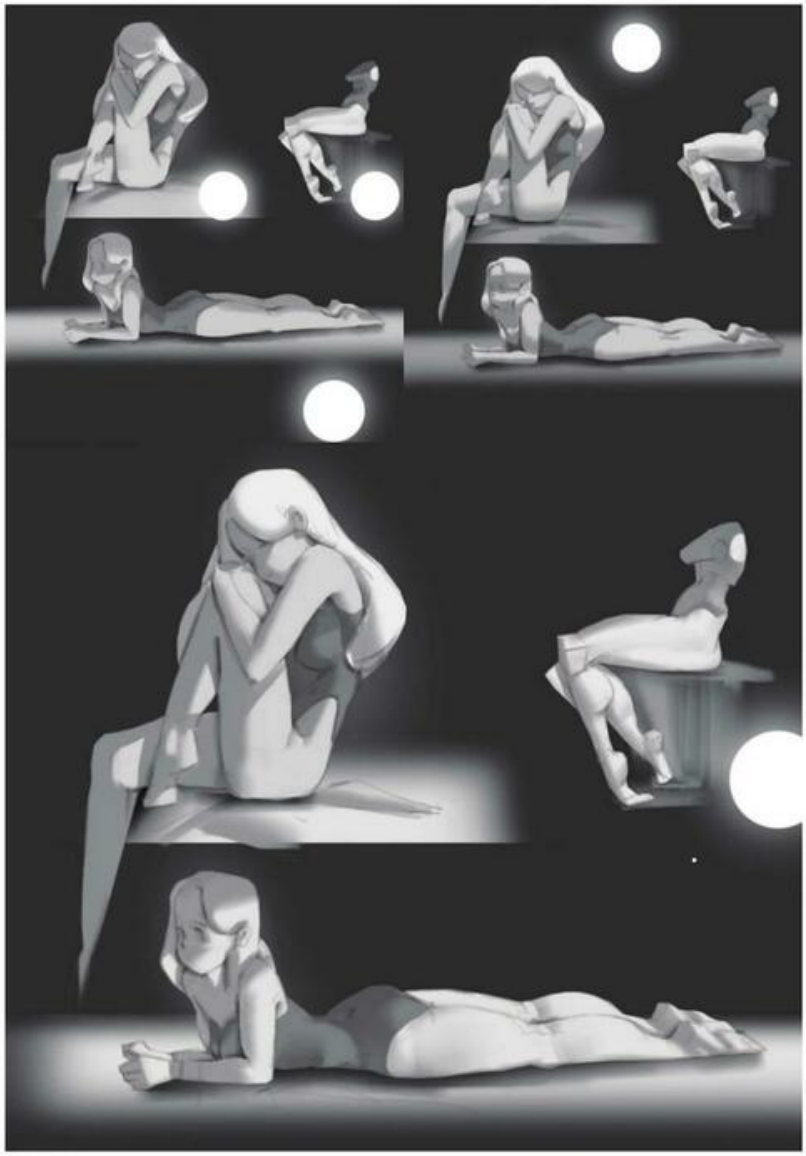


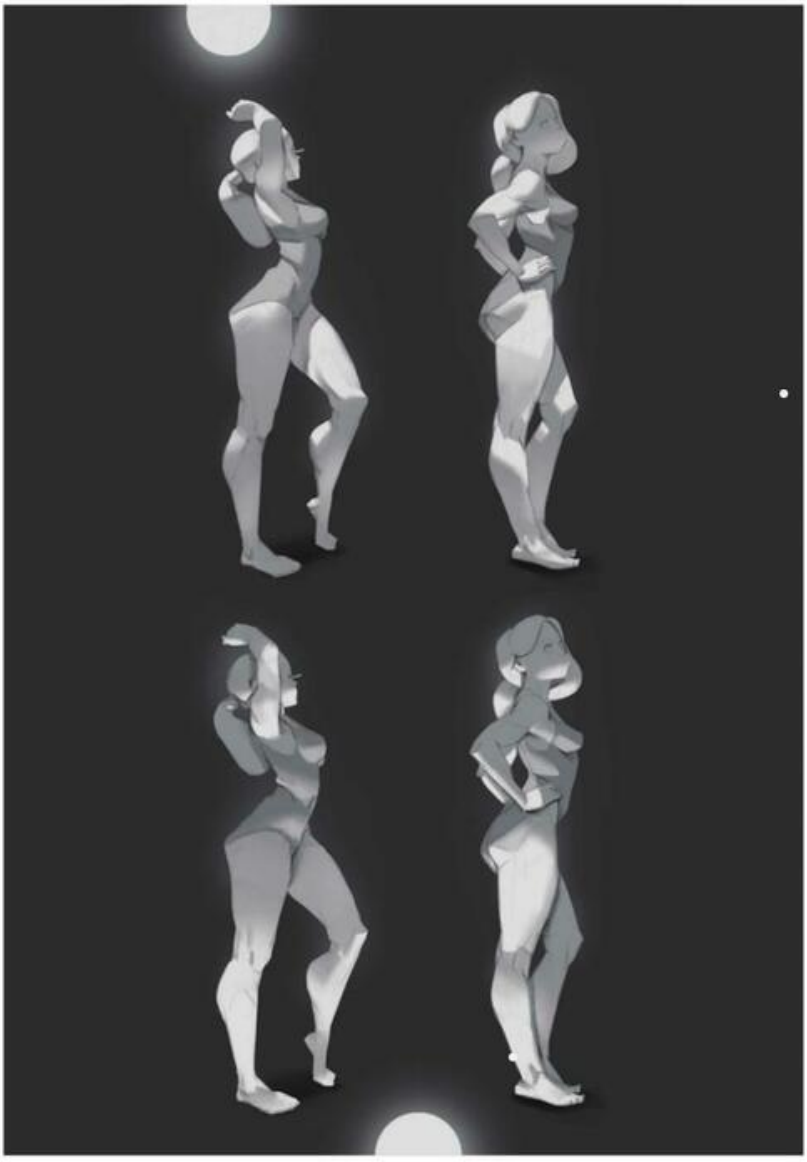


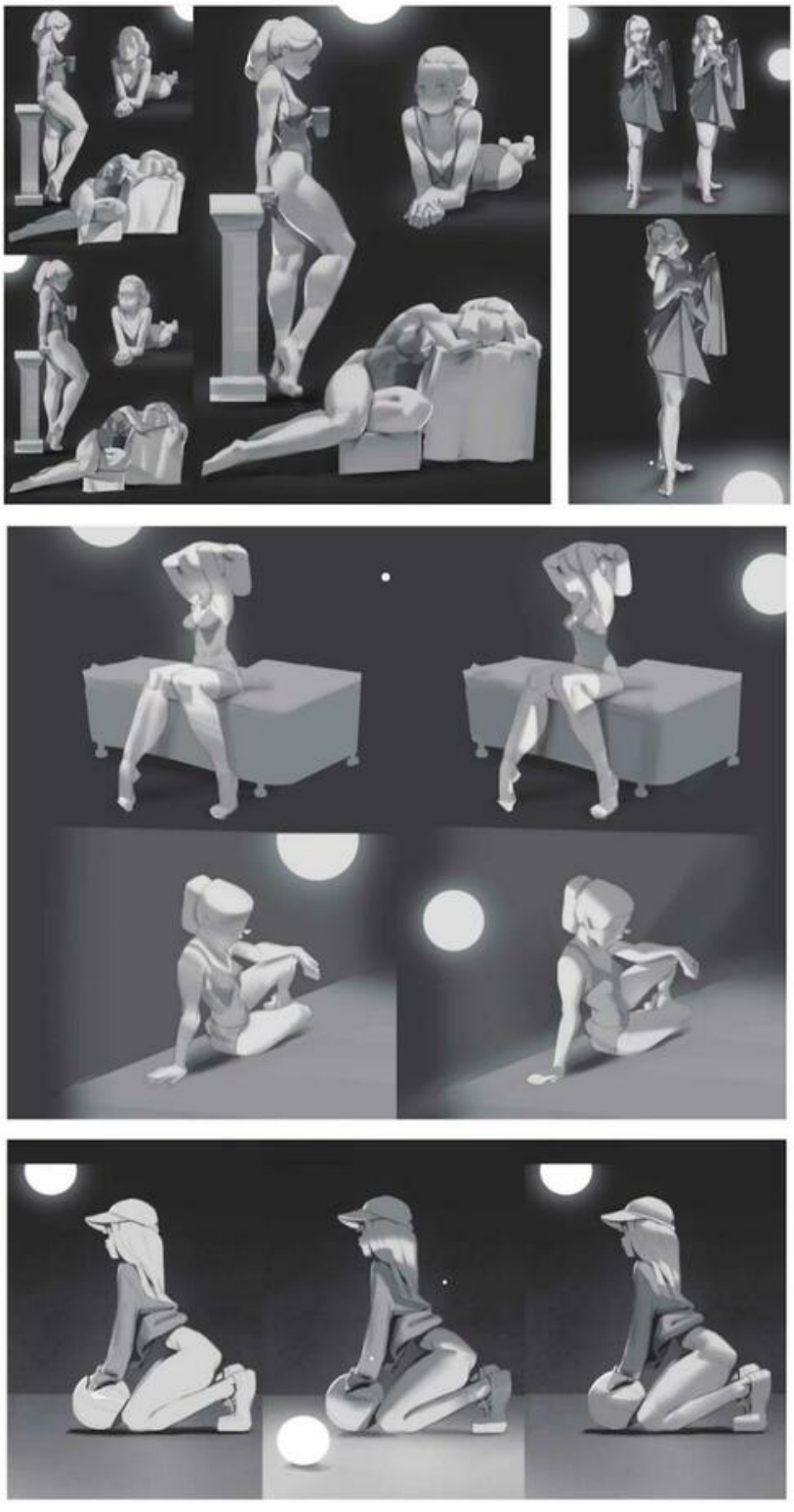


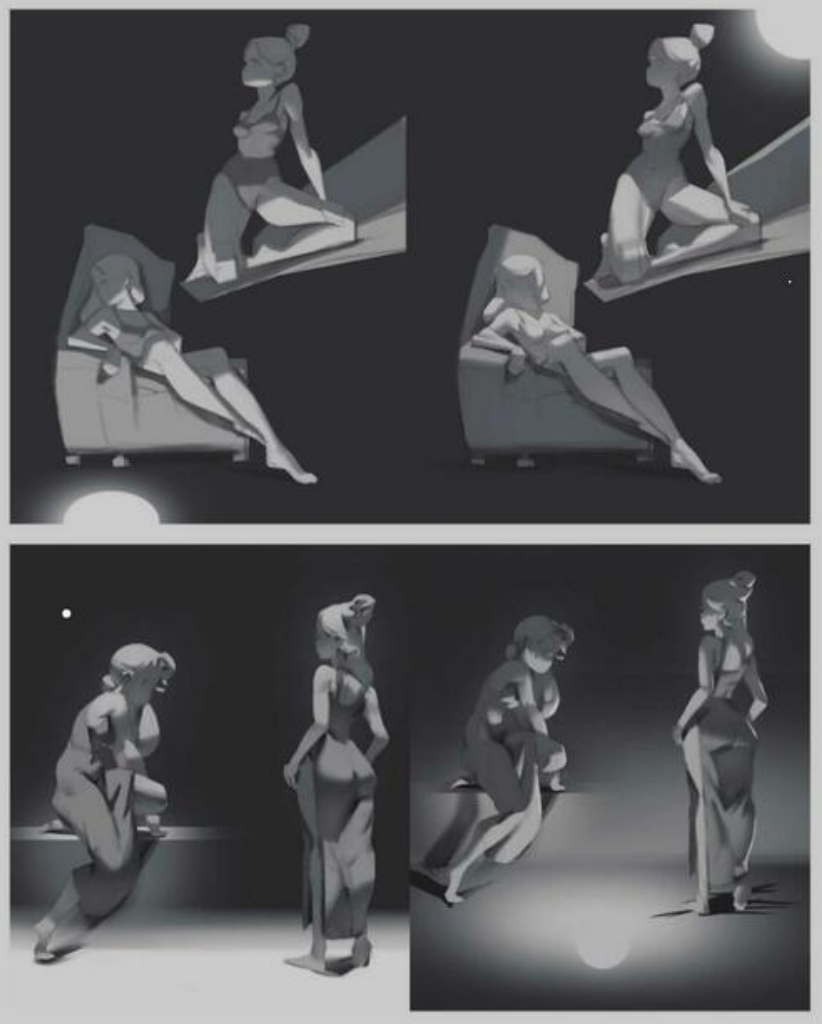


Do a set of light and shadow transformation exercises on the human body from multiple angles.



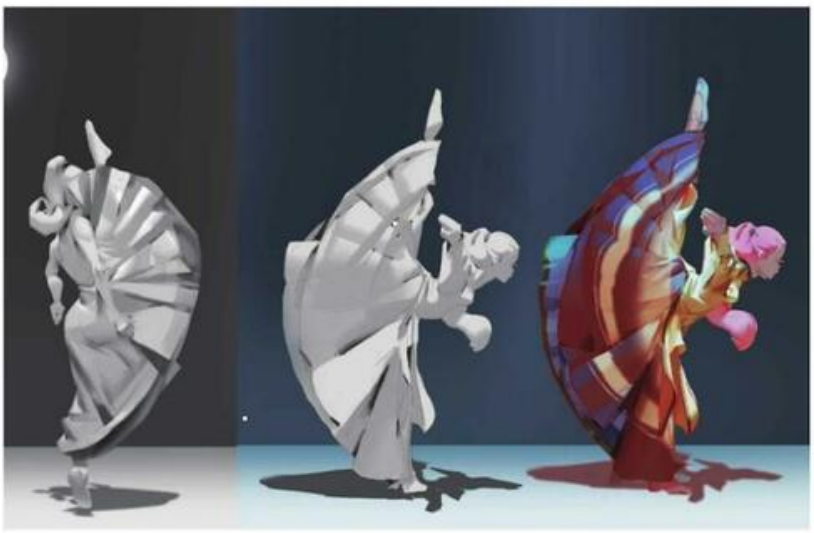






Do a set of light and shadow shaping exercises for anime characters.

Do a body light and shadow exercise for a set of dance moves.



fragrant

Chapter 9 Pleated Special Training

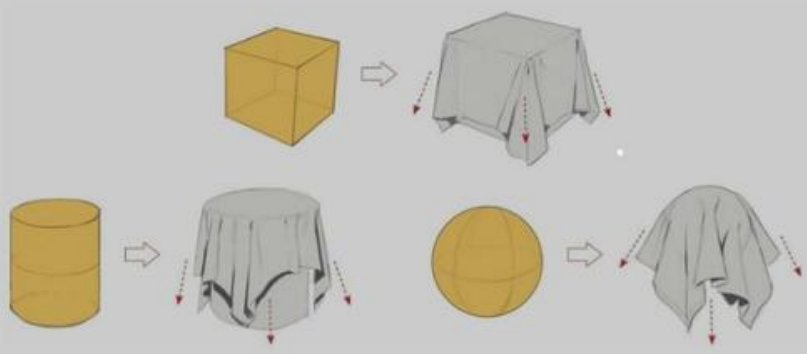
When painting, most of the human body is wrapped under clothing. Therefore, if you want to give full play to your creativity and imagination in the process of creation, in addition to mastering the structure of the human body, you must also have a clearer understanding and understanding of the folds of clothes. Accurately showing the changes of clothing folds can create a more realistic picture effect.

9.1 Formation of pleats

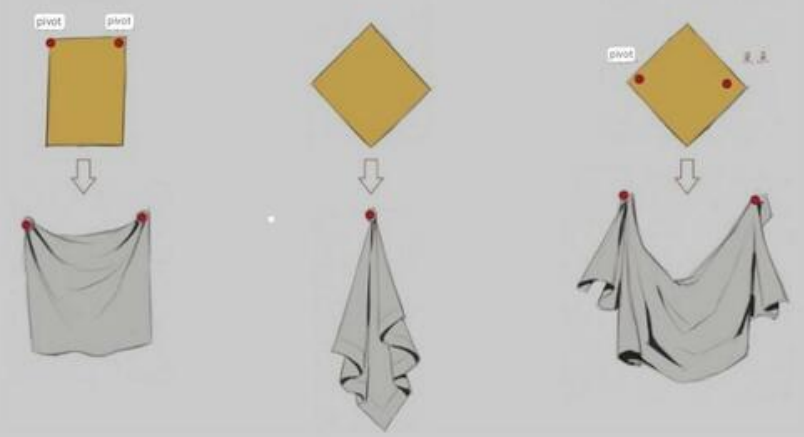
The folds of clothes are formed by the movement of the human body, the structure of the human body, and the influence of multiple factors such as wind and gravity.

9.1.1 Gravity factor

The cloth itself has no specific shape, but will form different folds under the action of gravity. Placing the cloth on the cube, cylinder, or sphere will produce folds of a specific shape, as shown below.

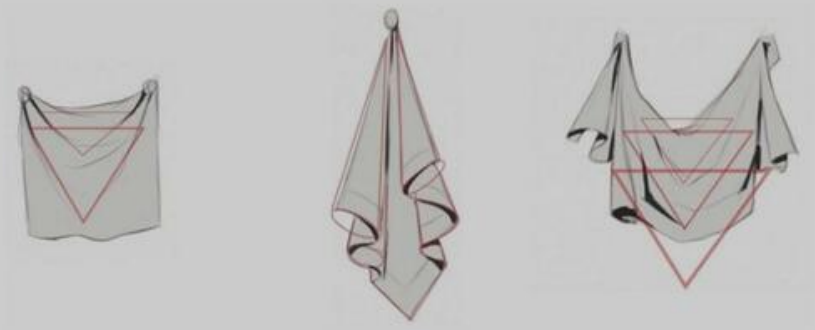


Fix the cloth to the wall with one or more nails, and the effect is shown below.

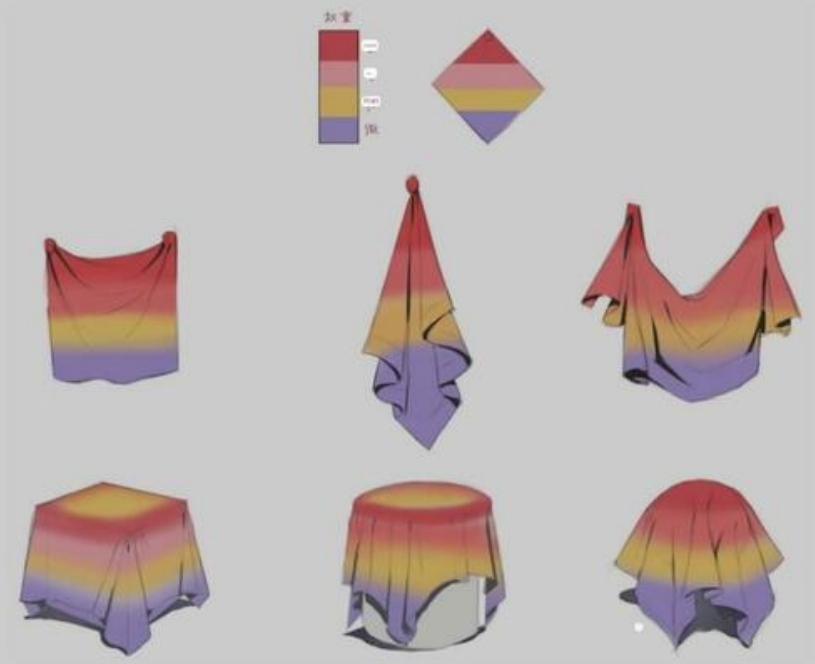


Through careful observation, we will find that the number of fixed nails and the distance between the nails are different, and the shape of the cloth is also different. The farther away from the nails, the looser the folds of the cloth part.

Furthermore, in some 3D software algorithms there is a concept of weights. That is, the closer to the pin point, the more affected the shape of the soft body, and the more obvious the shape undulation. The farther away from the pinpoint, the less affected the soft body shape, until it disappeared.



The figure below shows the color change of the cloth affected by the weight of the nail point.



The figure below shows a schematic diagram of the shape change of the cloth under the action of multiple fulcrums.

When the skirt is pulled by hand, it will take the form of pleats supported by 3 fulcrums.

9.1.2 External extrusion

In the case of no external pressure on the cloth, its shape is generally very regular. When there is pressure on the fabric of the clothing, different forms of folds will appear.

降压
降压
加重
重
中
轻
微

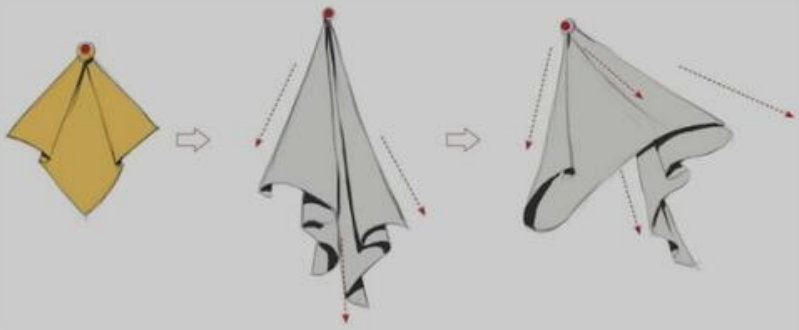
9.2 Common pleats

It was explained earlier that the fabric of clothes will produce different forms due to the change of support point and pressure. folds. Next, let's sort out and analyze the folds of different shapes.

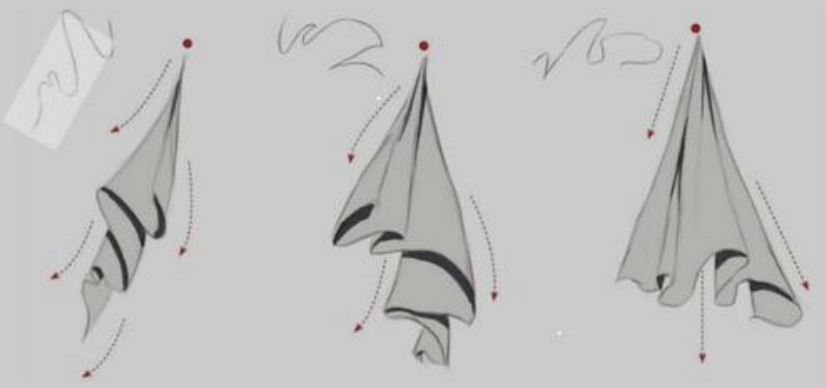
We can decompose the pleats into various forms such as drape, tubular, spiral, chambray, zigzag, and half-buckle.

9.2.1 Drop type

The drooping pleats are mainly caused by the rhythmic twisting of the cloth down to the edge after the cloth is detached from the supporting point, and it is often found at the hem of the long skirt at a standstill.



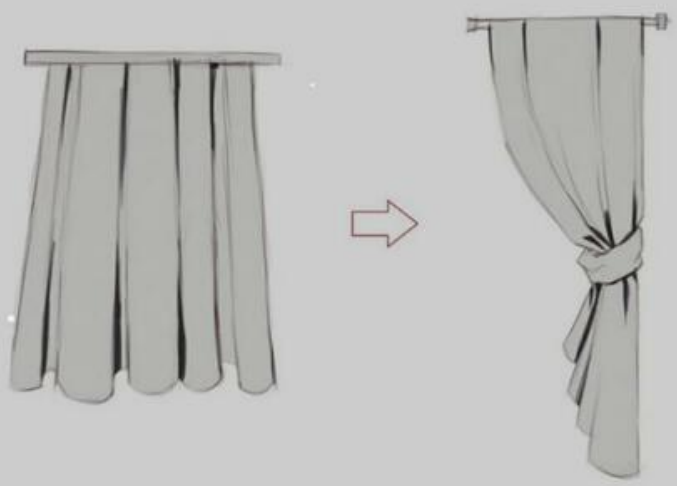
We can first draw the basic shape and trend of the pleats, and then connect them to the support points according to their curves to show the complete pleats.



9.2.2 Tubular

Tubular folds are a form of drop folds, which are formed when the rest of the fabric is pulled down by gravity after being hung at a single point. The shape of this fold is like a cone, and the apex of the cone is the support point for hanging clothes.

The figure below shows the structural cross-sectional view of the tubular fold and the schematic diagram of the effect after being squeezed.



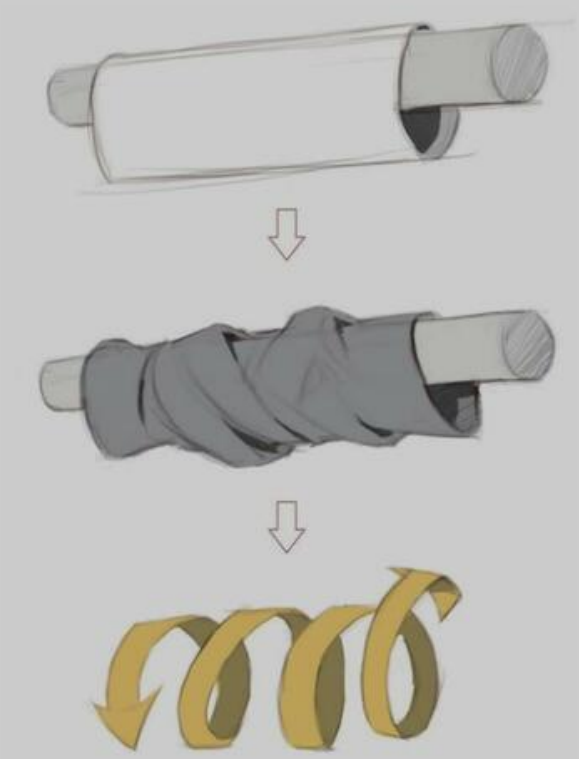
Tubular folds typically appear around the hem of a long skirt or around the tie of a belt.

9.2.3 Spiral

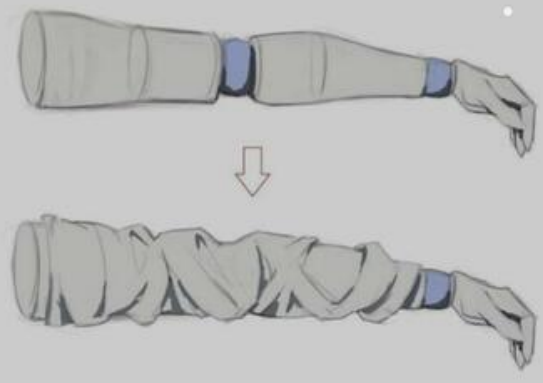
Helical folds form when the cloth is compressed and twisted around the cylinder. These folds radiate outward from the support, usually at curved joints wrapped by the cloth, such as

Elbow etc.

Unlike semi-closed folds, helical folds are not stretched while compressing, but are evenly compressed around the cylinder, and the compression is so large that through folds are created.

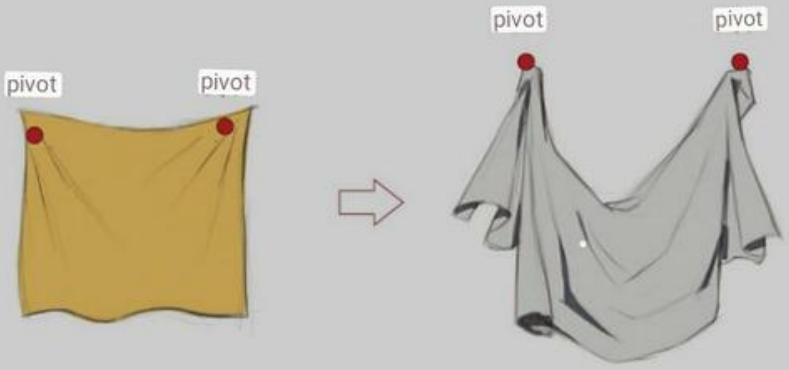


The structure of the helical pleat is shown below.

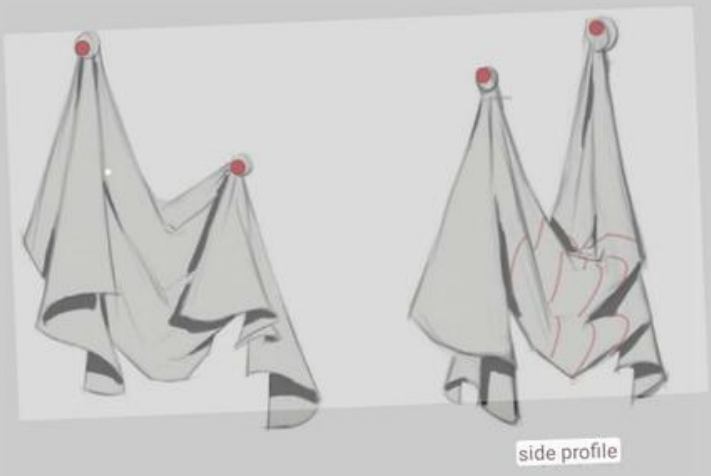


9.2.4 Shawl Type

Shawl-type folds are two ends of a piece of cloth that are fixed with a certain distance, and the rest of the cloth sags under the influence of gravity, which will produce several groups of "V"-shaped folds, and the lower the folds, the looser they become.



The effect and side effect of the shawl-shaped pleats at different pivot positions are shown below.

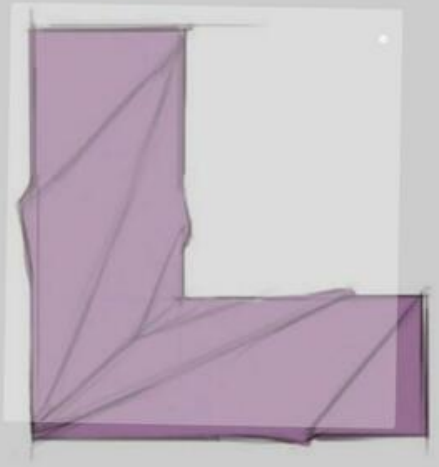


The combined effect of the chariot folds and the drop folds is shown below.

When a person wears a shawl, it will show a very typical shawl-shaped fold. Below, the author color-coded the shawl-shaped folds of the shawl that were changed due to the influence of the weight fulcrum.

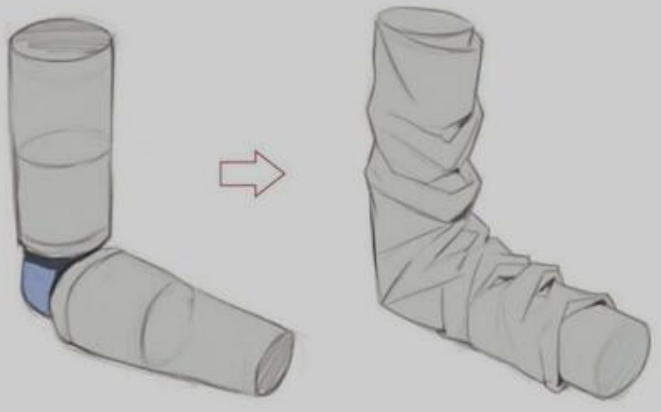
9.2.5 "Zig"

The zig-zag fold is a hybrid fold that occurs when the fabric is subjected to both gravity and resistance. This wrinkle is often seen at high collars, wrists and pant legs. The image below shows the side effect of the zigzag pleats.

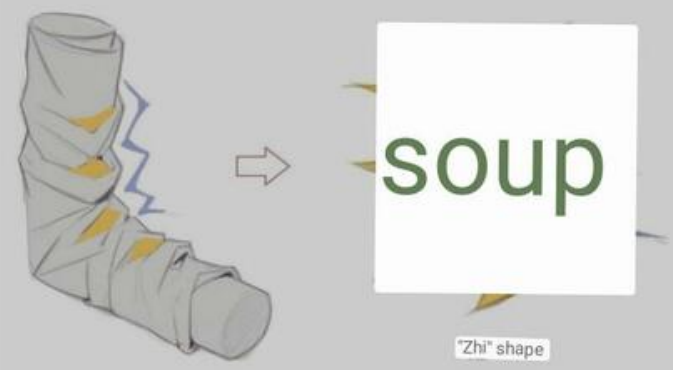


side

The modeling structure principle of "zigzag" fold is shown as follows.



In painting, the closer the cloth is to the bend of the arm, the denser the zigzag structure. According to the upper and lower perspective relationship of the arm, the zigzag structure will also change with the perspective.



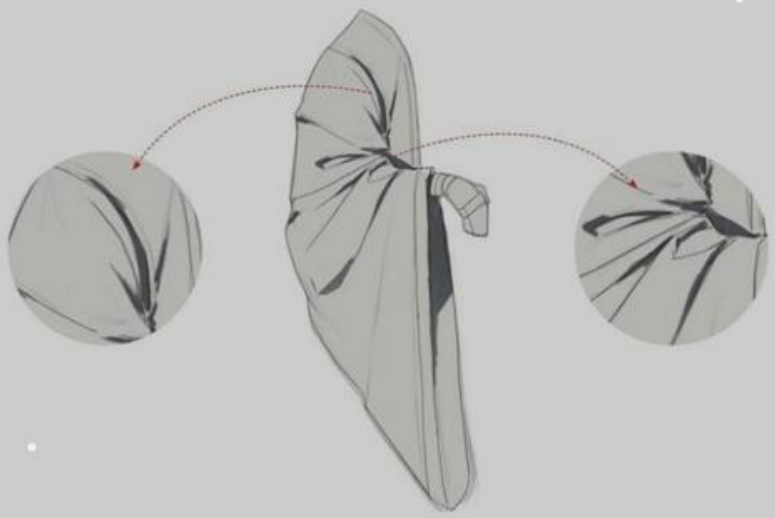
9.2.6 Half buckle type

The principle of half-buckle folds is to assume that an object is covered with a layer of cloth. When the object is bent to one side, a half-closed half-buckle fold will be generated at the bending place.

Half-buckle folds often appear at the turning points of garments, where the fabric folds against each other due to the pressure, and the creases protrude.

When the knee is bent, the leg will pull on the clothing, and the fabric on the back of the knee will show more raised folds.

Half-buckle folds also appear when the arm is bent.



9.3 Basic exercises for pleats

When we understand the several pleats mentioned above, we can practice the comprehensive expression of pleats.

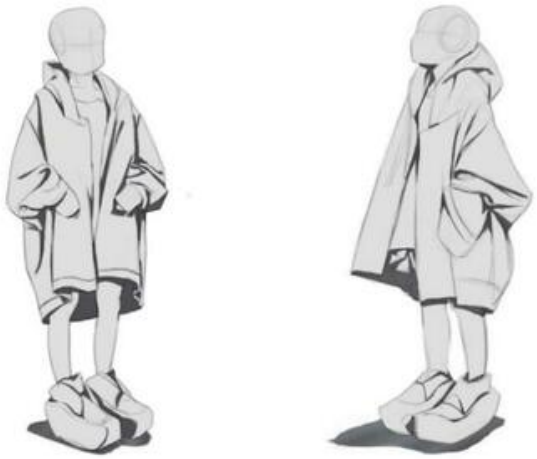
Generally, we need to show one or several shapes of pleats. The most important thing in the process is to learn to analyze stress and simplify. Pleated construction.

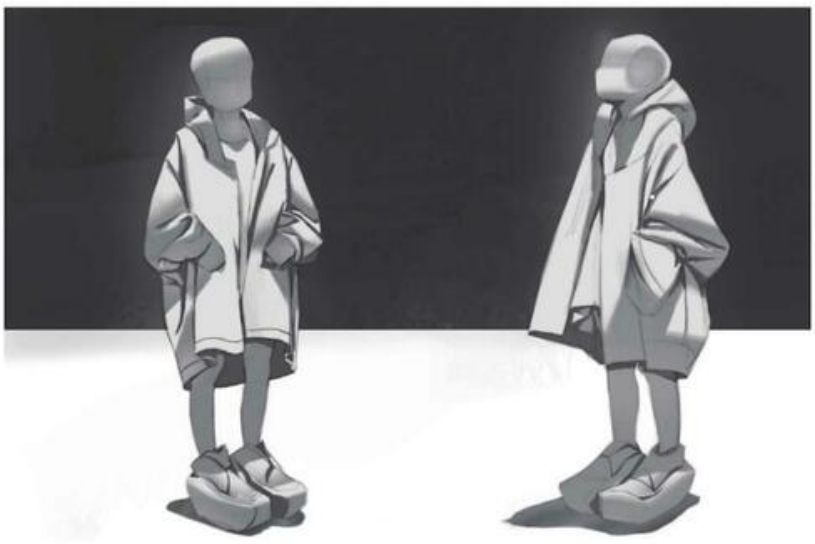
9.3.1 General practice of pleats

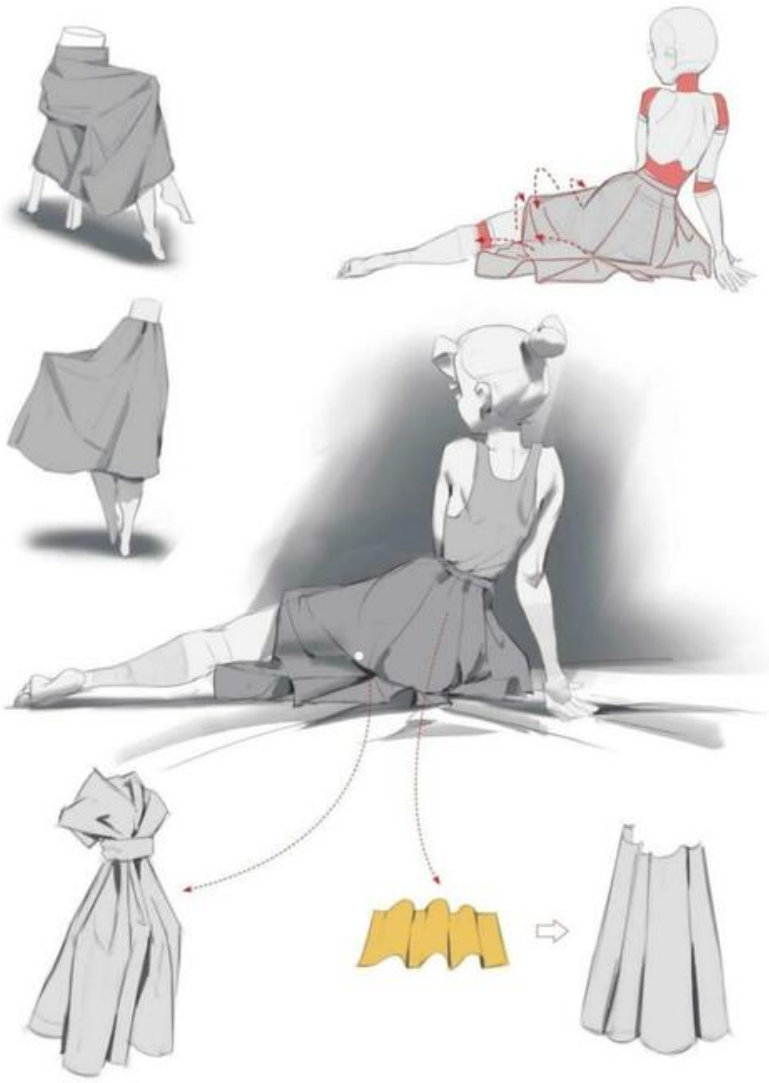
When we practice the pleats against real objects or reference photos, we usually find that the pleats are very complicated and difficult to write. We can simplify the complex fold structure according to the knowledge we have learned before, and then do some exaggeration, so that the folds will be more tense.

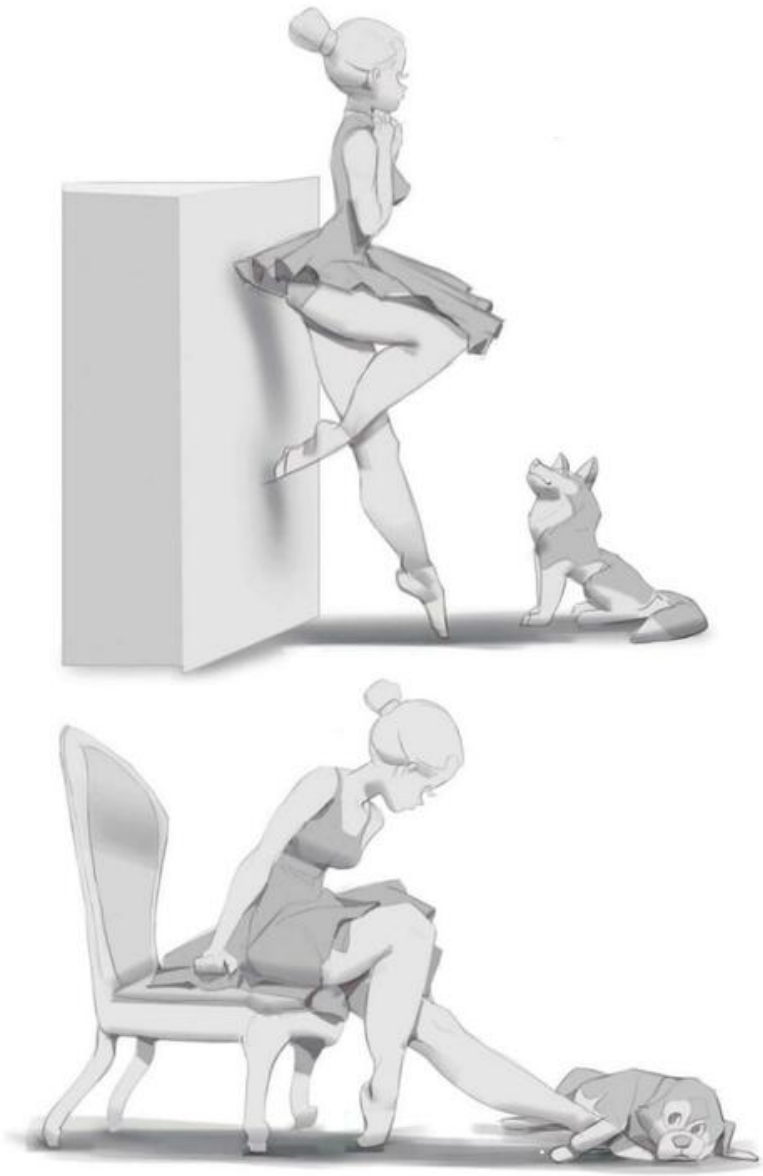
Take the following picture as an example, analyze the blue force fulcrum from the photo, pay attention to not more than 4 folds radiating outward from each fulcrum, otherwise it will appear messy. The blue fulcrum does not need to be generalized too much, just draw a few main and obvious ones. Summarize the light-receiving surface and the backlight surface of the clothing as much as possible, and try to conform to the changing law of the intersection of light and dark, so that it will look more organized.

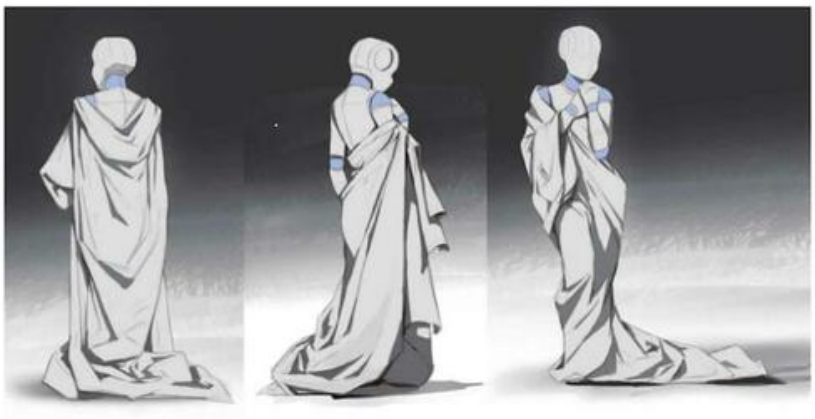
After the analysis, draw a line draft, black out the areas that are completely unaffected by the light, and make the transition between the light-receiving surface and the back-lighting surface more natural.

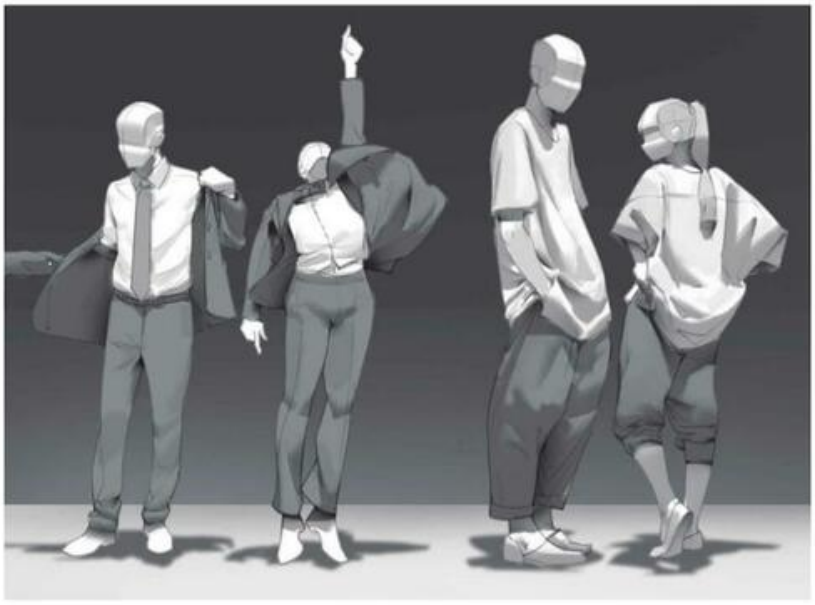


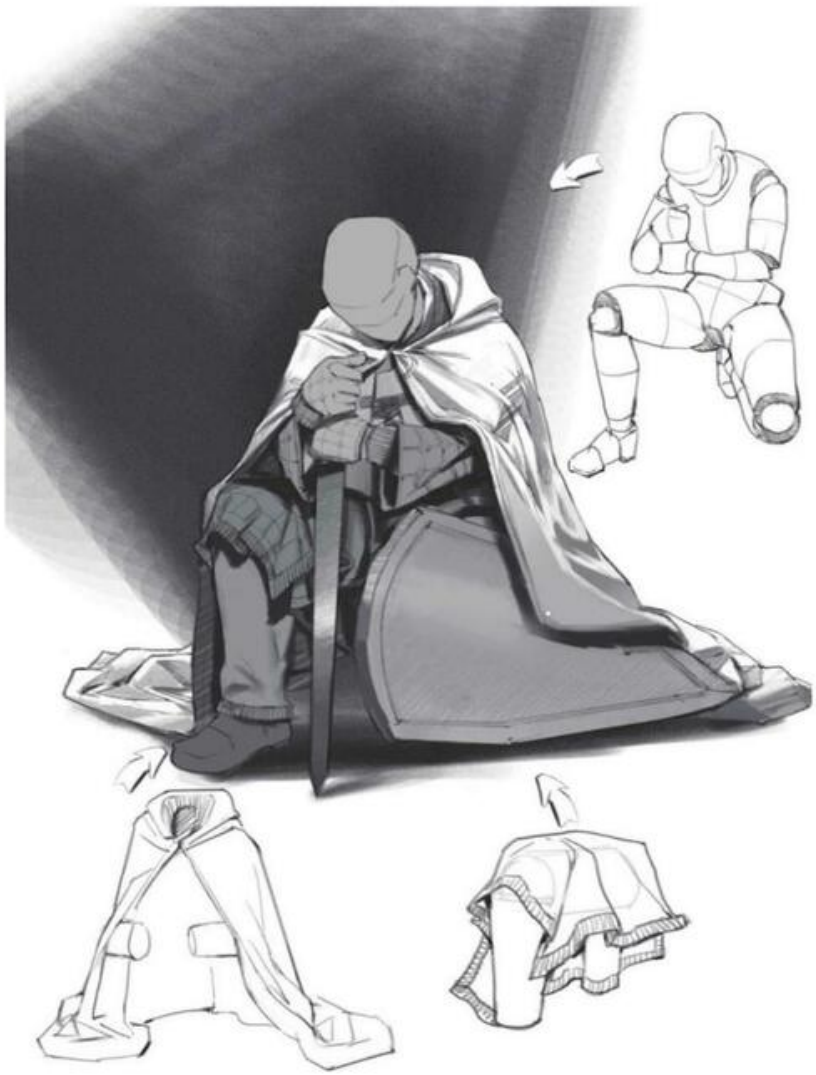


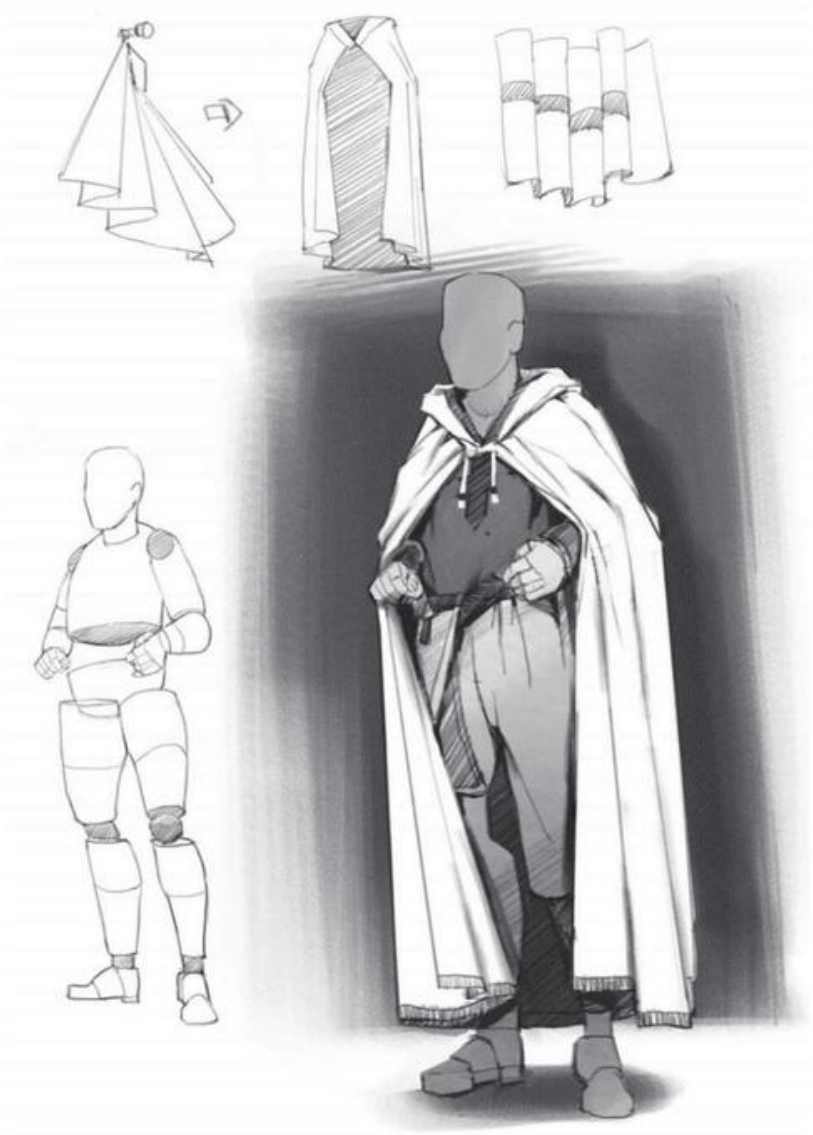


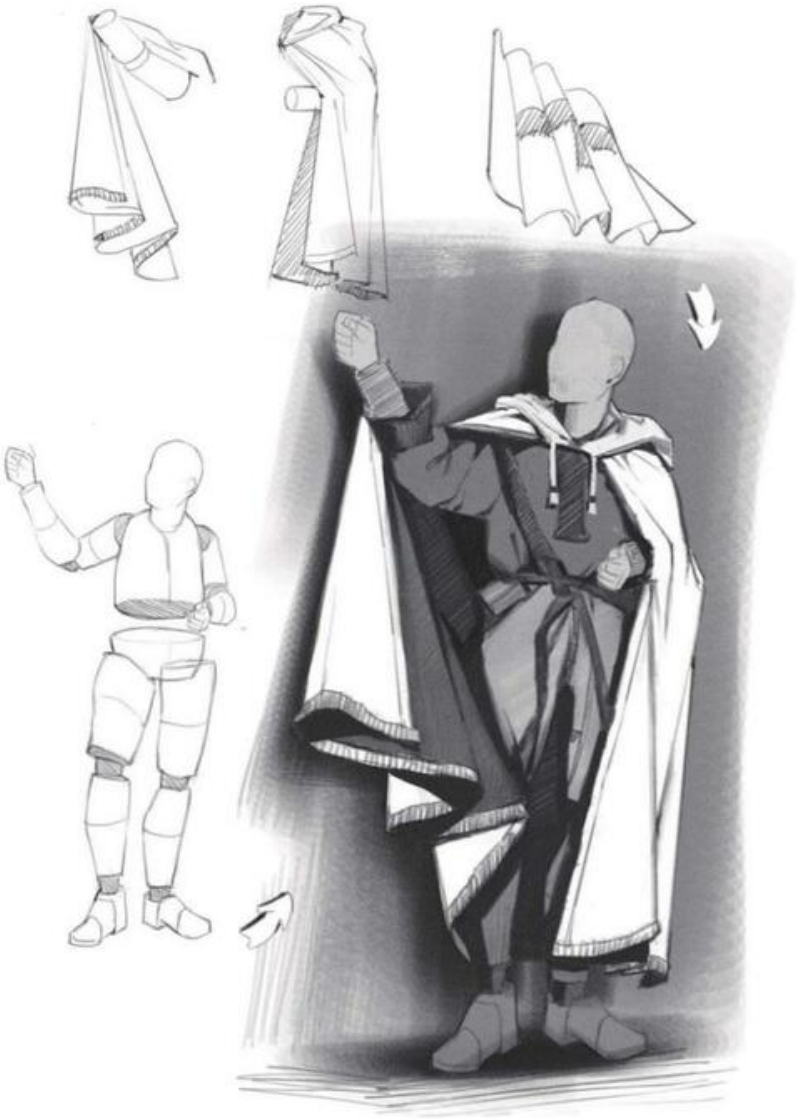












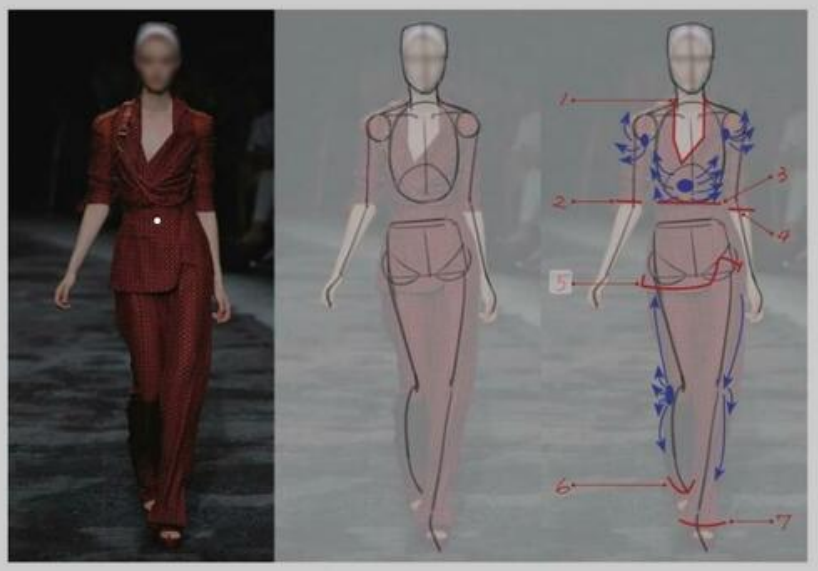
9.3.2 The relationship between the pleats and the human body

After learning to draw the human body, what everyone wants to do most is to "dress" the human body, but it is not enough to only analyze and summarize the relationship between the folds of the clothes in the photos, but also learn to analyze the effect of clothing tailoring and segmentation of different characters.

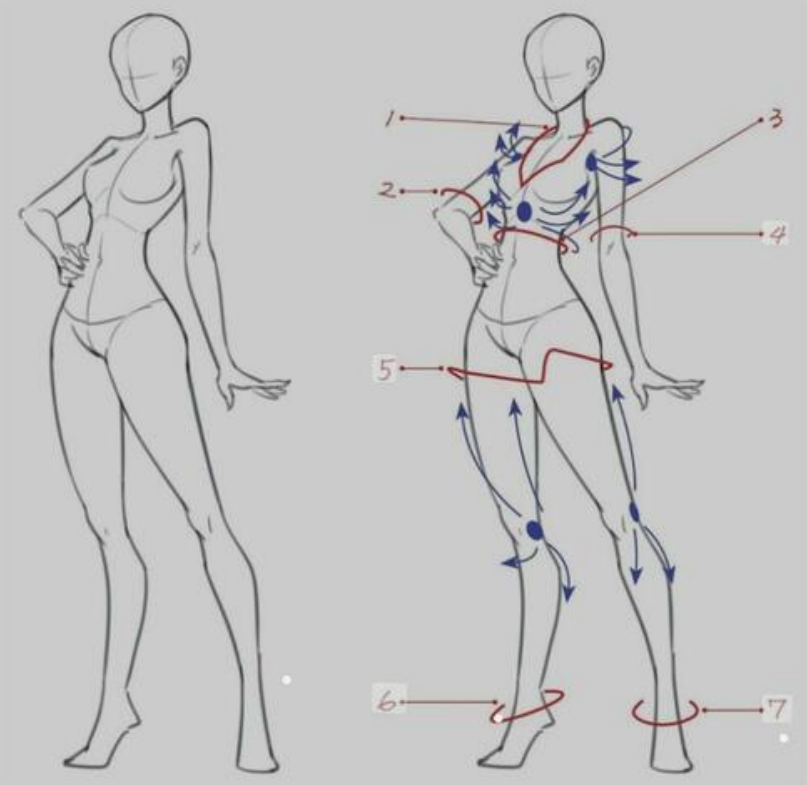
The clothing tailoring mentioned here is different from the concept in clothing design, which refers to how the clothing divides the human body into appropriate proportions. After the proportions are divided, the pleats are drawn according to the turning point of the human body structure.

In this way, the human body can be drawn realistic and beautiful. Here is a training method using photos as a reference.

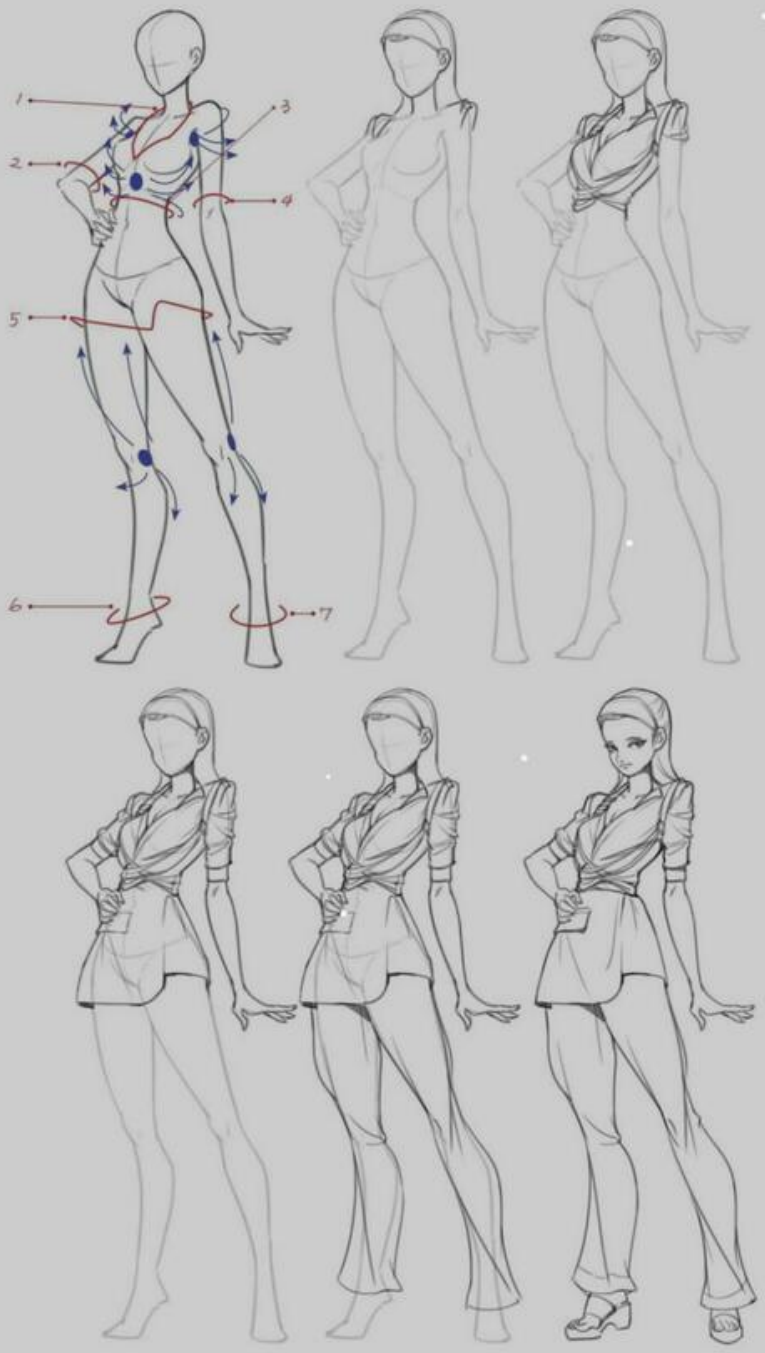
Choose a photo, preferably a catwalk photo, analyze the structure of the person in the photo, mark the 7 cutting lines (red parts) of the clothes in the human body structure, and pay attention to the positional relationship between the human body structure and the cutting lines. Analyze the compression points (blue part) of the pleats, and summarize the obvious and important points.



After the analysis is completed, draw a different action, and find the position of the clipping line and the force-extrusion point just marked in the new action. Note that after the action changes, we need to analyze the expression of folds through the spatial relationship between the human body structure, the cutting line, and the point of stress.



Refinement based on clip lines and stress squeeze points.



Everyday, you can collect more photos as material, and practice expressing the relationship between the pleats and the human body.

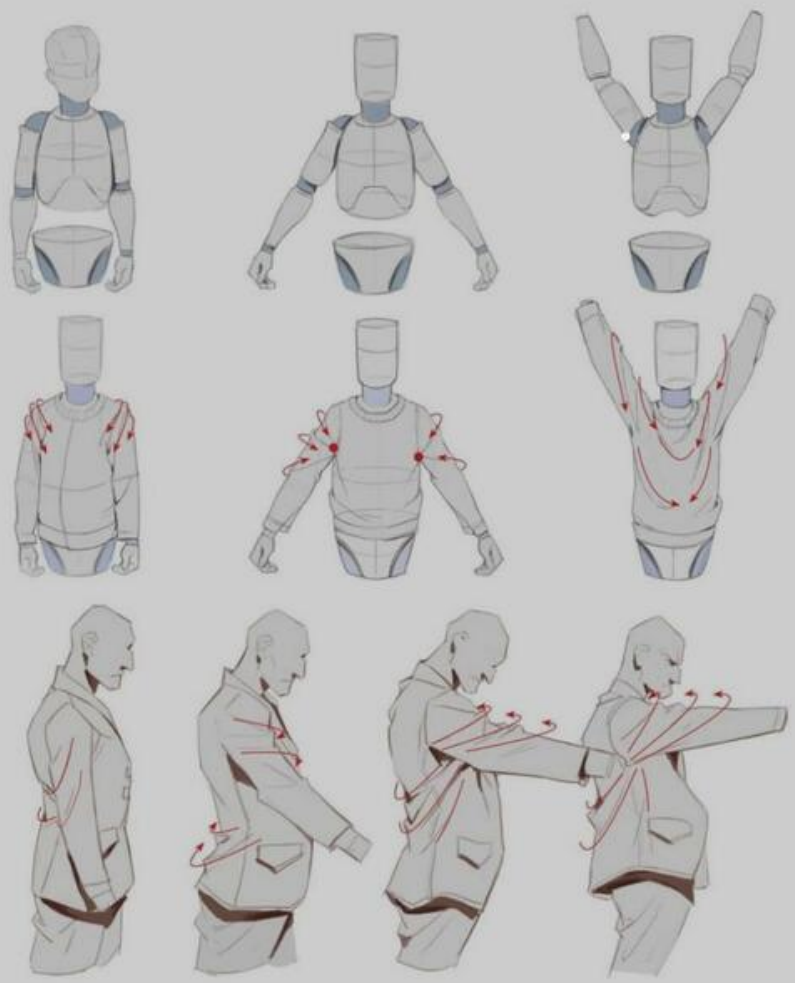
After mastering the above methods, you can set the character's actions and clothing styles by yourself.

Adjust the character's body shape and dynamics, and then add different styles of clothing and props to make the characters' clothing folds more vivid and interesting.

Draw more exaggerated body shapes and costume props to make the characters look more American.

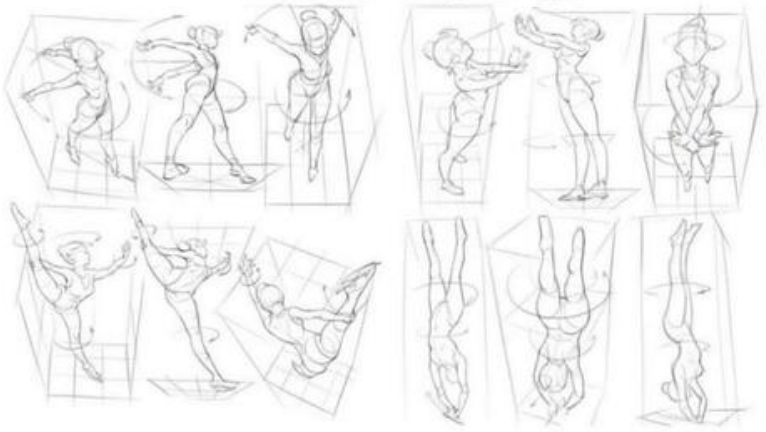
More special training

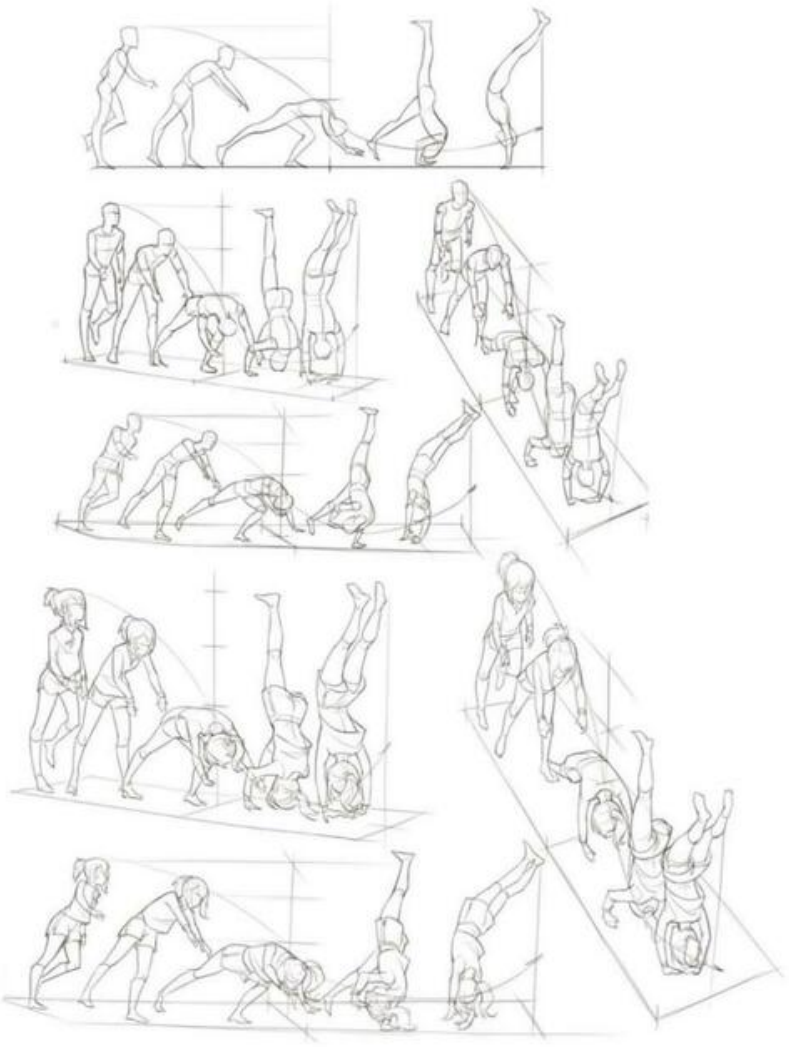
Do a set of pleating exercises for arm lifts.

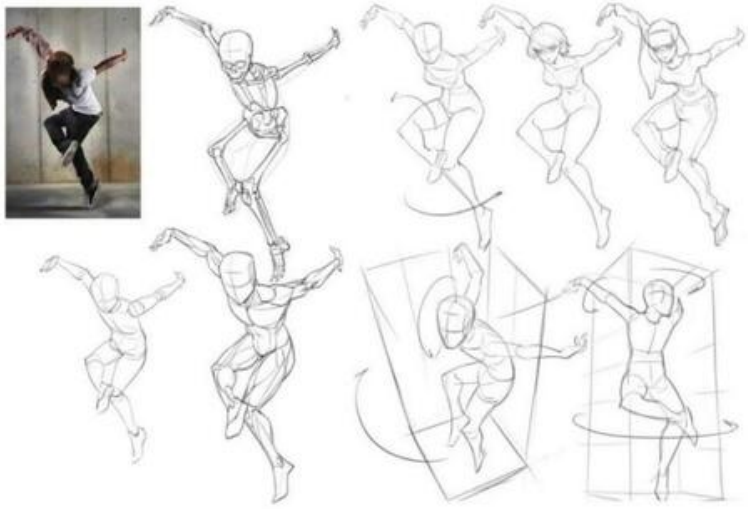


Refer to photos to do A set of clothing setting exercises.

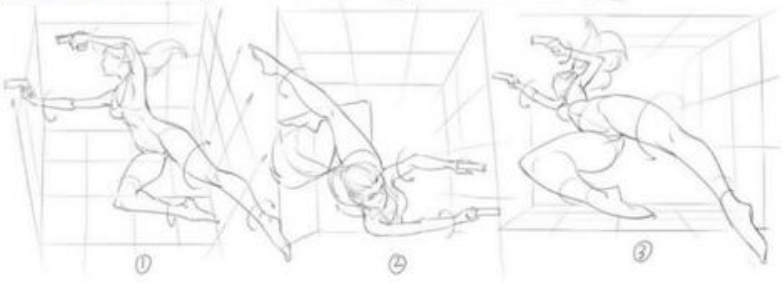
Do a set of full body pleating exercises.



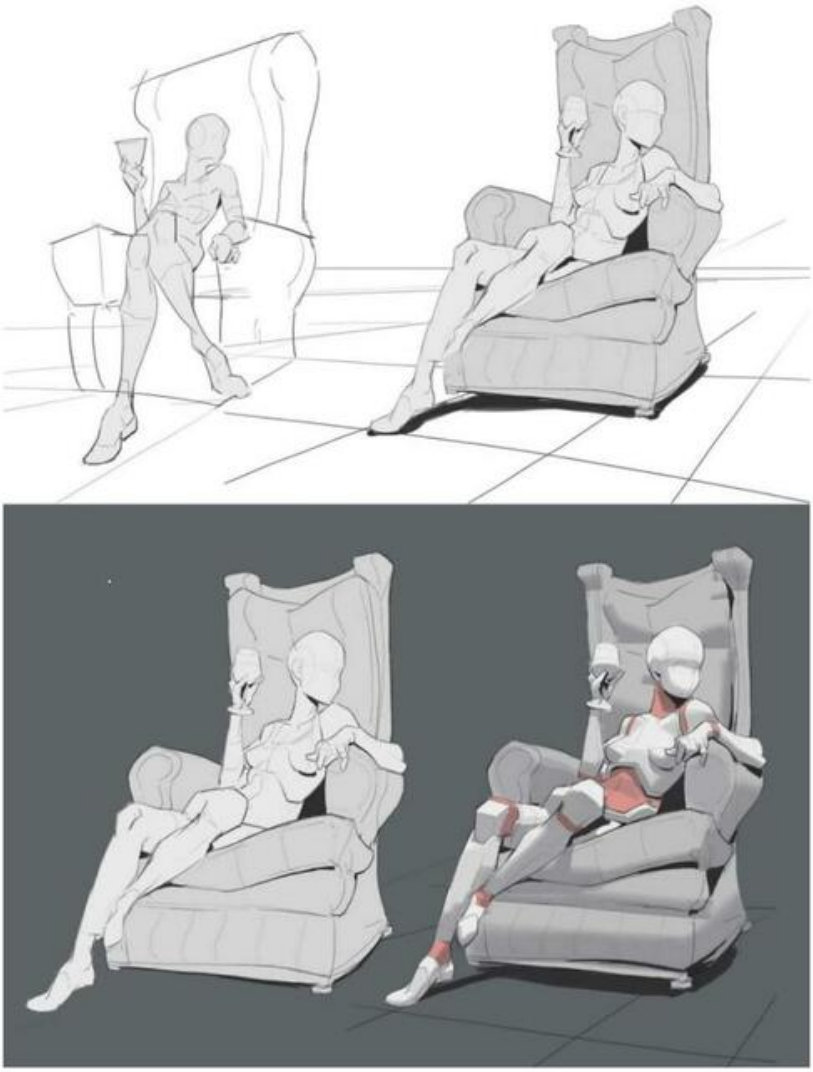


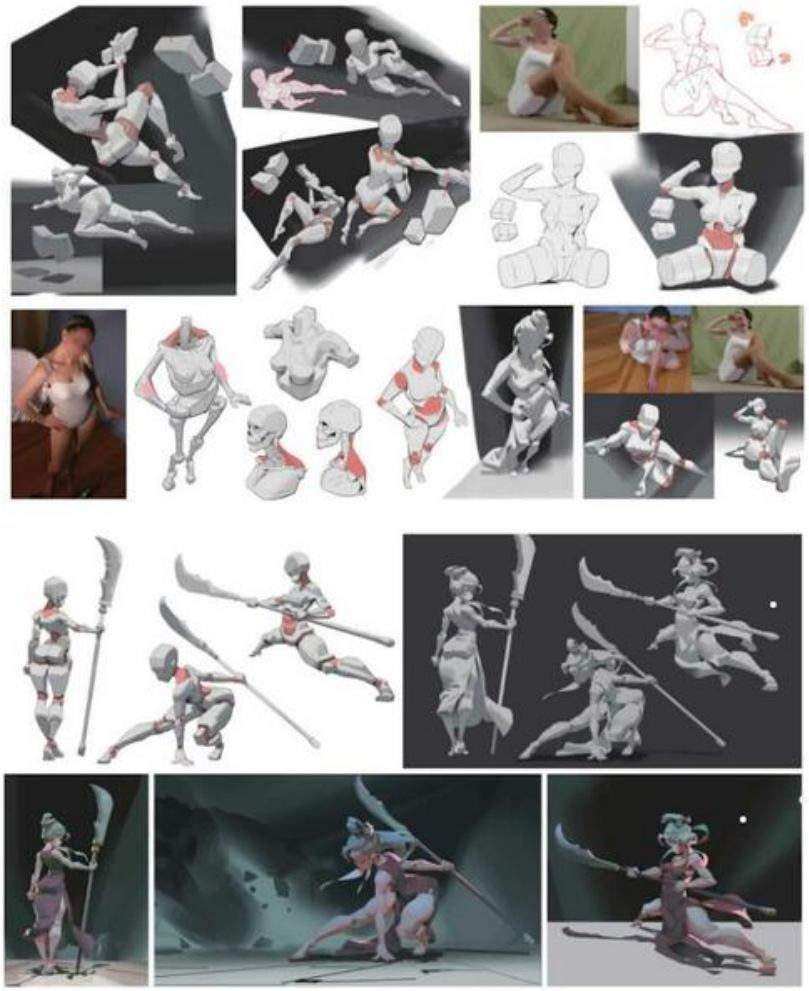


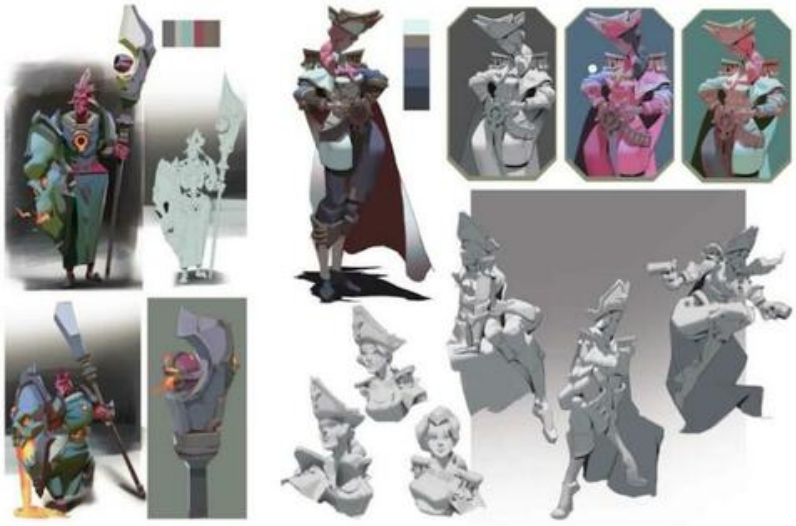
2
1
3


①
②
③

①
②
①
②







Resource acquisition

Scan the QR code on WeChat to get the book resource acquisition

method Resource acquisition verification code: 10812